THE IRON AGE

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The Laboratories of the Modern Factory

Chemical, Physical and Metallographic Apparatus and Investigations of the Studebaker Corporation, Detroit, Mich.

BY E. F. LAKE

At automobile manufacturing plant No. 1, in Detroit, ch, the Studebaker Corporation has installed quite an ensive laboratory. Its different departments consist chemical, microscopical, physical and electrical rooms quite a number of men are engaged in analyzing, exning and testing the various kinds of materials and aratus that enter into the construction of the complete or car.

This department has been made a practical commerproposition and the work done is of the kind that a direct bearing on the quality of materials purchased

Fig. 1—One End of the Room for Chemical Analysis

d the work done throughout the different shops of this mpany. It is needless to say that savings are effected in ny ways in the cost of production and these pay, many es over, for the cost of operating the laboratory in the rse of a year. In addition to this the reports coming m the laboratory show the materials of construction ich give the greatest strengths, the best wearing quali- and the longest life. Hence the designers of the car enabled to choose their materials from actual tests that made and not from the talk of salesmen who sell e materials. Thus they are enabled to build an automobile that is durable and as light as the strength required for the various parts will allow.

One simple illustration of the saving in cost of materials is shown by a bearing alloy. This alloy was given a special name that had been copyrighted and was of the "special secret composition" kind so often encountered in metallurgy. It was represented by a salesman, whose story was so good that it made the purchasing agent think there might be something in it. Consequently he turned a sample over to the laboratory and it was found to be nothing more nor less than a good grade of babbitt metal, although its price was several cents a pound higher, the additional price probably being charged for the copyrighted name.

A case of a similar nature, that happened in a different place, was that of a spring manufacturer who was paying $5 per pound for a special secret chemical in which to draw the temper of spring plates made from a high grade alloy steel. This chemical was melted and kept molten by an electric current passing through it in such a furnace as that made by the General Electric Company, which was described on page 174 of *The Iron Age*, July

Fig. 2—One Side of the Chemical Balance Room

Fig. 4—The Room for Metallographic Investigations

24, 1913. This chemical bath was maintained at a temperature of 750 deg. F. The spring plates were immersed in it until they reached that temperature and they were then taken out to cool. A chemical analysis of this "wonderful chemical," showed it to be composed of sodium nitrate and potassium nitrate. The chemically pure grades of these can be bought for between 10 and 12 cents per pound, while the commercial grades only cost between 5 and 6 cents per pound. In this case a chemist saved something like $25 per day and a metallurgist could have readily told the kind of salts that are the best in which to heat steel to a given temperature.

The completeness of the laboratory is shown by the accompanying reproductions of photographs. In Fig. 1 is shown one end of the room used for the chemical analysis of the different materials used by the company. Counting from the back end there are five tables, each one of which is equipped for determining the five principal elements occurring with iron in steel. For instance, at the rear table, analysis is made for sulphur; at the next for phosphorus; at the next for silicon; at the next for manganese and at the last table, or the one nearest the front of the picture, the carbon content is obtained. In the foreground is a sink, while in the rear and along the side are hoods for carrying off any fumes that may arise. In front of these are several other tables that are used for analyzing the non-ferrous metals and alloys and other materials.

The table tops are of wood specially prepared to resist the acids and other chemicals used in an analytical room. Iron, stone or marble tops are attacked by different acids and soon become rough and unsightly, while glass is attacked by hydrofluoric acid. All of these are much harder than wood, and glass utensils are more easily broken on such table tops. One of the best processes for making wood table tops immune from attack by the acids and chemicals used for analysis consists of applying four different solutions and then washing with soap suds and rubbing with vaseline. No. 1 solution is composed of copper sulphate 50 g.; potassium chlorate 40 g.; and water 500 c.c. No. 2 solution is aniline hydrochloride 50 g., ammonium chloride 40 g. and water 500 c.c. No. 3 consists of potassium bichromate 50 g. and water 500 c.c., and No. 4 solution is composed of sodium sulphite, 80 g.; sulphuric acid 20 c.c. and water 500 c.c. These four solutions should be thickly applied with a brush in the following order: Nos. 1, 2, 1, 2, 3, 4, 3, 4. Each coat should be allowed to soak thoroughly into the wood and dry well before the next solution is applied. After the last application of No. 4 soap suds must be thickly applied to fix the color and make the wood more resistant to acids and alkalis. Then by well rubbing with vaseline the table top will be given a soft luster and repel water.

The analytical room is supplemented by a weighing room, as shown in Fig. 2, and a wash room, as shown by Fig. 3. In the weighing room the chemical balances are shown on a table top that rests on iron legs. These in turn rest on a concrete foundation that is deep enough into the ground to overcome any vibration that might be caused from the machinery in the building. The table top and legs do not touch the side walls at any place and hence vibration cannot be transmitted through the walls. Thus accuracy in weighing can readily be obtained. This weighing room is always kept closed in order to keep

Fig. 3—Wash Room for Chemical Apparatus

Fig. 5—Physical Testing Room

the balances free from dust or dirt and from any fumes that might rust or corrode them. A separate room is also used for washing the apparatus, so this refuse and dirt will be kept out of both the analytical and balance rooms.

It is not long ago that chemistry became of practical use to the manufacturer. As with all other new things, many enthusiasts claimed that all a manufacturer needed was a chemist, if he would know all about the materials used in constructing his machinery or apparatus and, in particular, the metals. The real chemist never made any such claims for he knew his limitations. While chemistry is of vital importance and is the foundation, or fundamental principle, on which all tests, experiments and investigation must be based, it must be supplemented by other examinations and tests if we are to know the valuable properties of metals and other materials that are used in constructing any piece of machinery or apparatus. Hence this company has installed a metallographic room, a physical testing room and an electrical testing room to aid the chemist in his work.

As late as 1907 one of the technical papers started a discussion as to whether or not chemistry told the whole story, although it was known long before that the strengths, wearing qualities and longevity of steels of the same chemical composition, as well as other metals or alloys, were greatly altered by the heat-treatment they received and also by their mechanical working, such as casting, rolling, drawing, forging, etc. The quantitative chemical relations are of great importance in determining the qualities of steel and iron, but the chemist has not fulfilled his mission when he stops with an analysis of the five principal ingredients. The oxygen and nitrogen that metals absorb in their making have a great effect on their physical properties, as also do the combinations that are formed by these and the five elements already mentioned. Thus by enlarging his field of vision the chemist can tell the physical properties that metals should have when they are worked and treated in the various ways that alter these properties.

The injurious effects of the presence of nitrogen and oxygen in steel have not long been recognized. The average steel maker, however, holds them in the same esteem in which he held sulphur and phosphorus, when the chemist first proved that these were actually injurious to steel. The steel maker does not have to be very old to remember the time when he sneered at the chemist for saying that the percentages of sulphur and phosphorus must be greatly reduced if the strength, wearing quality and longevity of steels were to be materially increased. Yet this is a recognized fact today, even though his father, and grandfather and great-grandfather made steels that were very good in their time.

The electric furnace and such scavenging materials as titanium, vanadium, aluminum, etc., have clearly demonstrated that a lowering of the percentages of the nitrogen and oxygen that are present in steels has added considerably to their strength and resistance to fatigue. In fact steels so treated are being called anti-fatigue steels. An analysis of one lot of 24 steel samples showed them to contain from 0.021 to 0.046 per cent. of oxygen. When we realize that 0.05 per cent. of oxygen may mean the presence in steel of 0.22 per cent. of ferrous-oxide, we can see that this is a large enough percentage to greatly weaken the metal. That this may be more injurious than sulphur is shown by the fact that 0.05 per cent. of sulphur may correspond to only 0.13 per cent. of manganese sulphide, which is the real injurious substance. Steels that are high in oxides blister and sometimes crack when they are in a pickling bath and they also crack on the edges when being rolled, owing to the creation of a red-shortness. Such steels also have a greater tendency to corrode than those containing less oxygen.

The success of vanadium is due largely to its great affinity for oxygen. With this it forms a compound that is lighter than molten steel, carrying the oxygen out of the metal into the slag before the steel is teemed into ingots. To this is due the fact that vanadium steels, when submitted to fatigue tests, show a much longer life than carbon steels. They also give greater strengths when submitted to the tensile test.

Tests have shown that each increase in the percentage of the nitrogen in steel causes the elongation to diminish rapidly and the ductility to reduce. The toughness decreases slightly at first and rapidly as the higher percentages of nitrogen are reached. Ordinary steels contain from 0.010 to 0.065 per cent. of nitrogen. In the higher carbon steels the elongation and contraction practically becomes nil when the nitrogen content reaches 0.035, while in medium carbon steels it may reach 0.050 and in low carbon steels 0.065 per cent. The Manchester Steam Users Association of England passed a rule that the phosphorus content, plus 5 times the nitrogen content, should not total 0.08 per cent. This was because numerous tests and experiments made them conclude that nitrogen was just as likely to cause brittleness and "cold-shortness" as was phosphorus and that it was just as injurious to steel.

While the chemist can tell what the physical properties of a given steel should be, when it is properly worked and heat-treated, he cannot tell whether this work has been correctly done. This is where metallography is a great aid, as each working and heat-treatment alters the structure of the metal and an examination under the microscope reveals the structure it has assumed. As the instruments used must be kept free from dust and dirt it is best to keep them in a room by themselves. Fig. 4 shows one corner of the photographic room. The instrument here shown not only permits a microscopical examination of the specimen to be made, but also allows a photograph to be taken of the magnified section. Microscopical ex-

Fig. 6—Scleroscope Testing for Hardness

Fig. 7—Machine for Testing Bearings

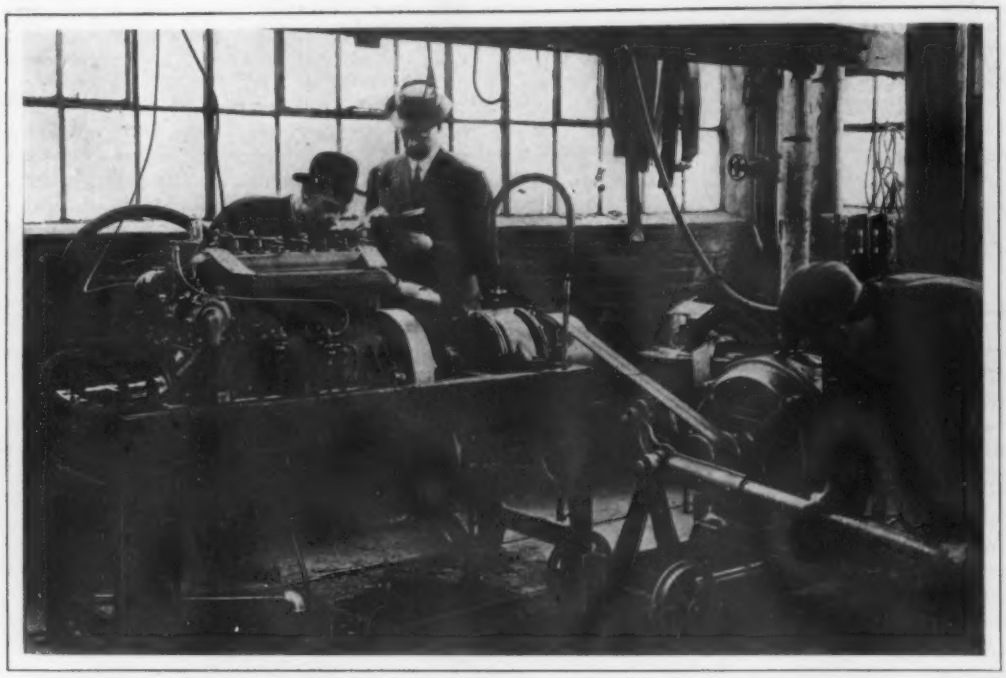


Fig. 8—Testing a Complete Automobile Engine

aminations reveal the exact heat-treatment that the steel was given. Different carbon contents, as well as a difference in the percentage of other ingredients, also gives the steel a different appearance under the microscope; therefore this work has become an important part of the complete laboratory.

In Fig. 5 is shown one end of the physical testing room. In the foreground is located a torsion testing machine. Next to it a table equipped for conducting hardness tests. Next to that a tensile and compression testing machine; while back of this machine is located a special machine for testing automobile bearings and to the right of it are some small electrical furnaces for experimental work. To the right of the opening, shown in the rear, is placed a machine for testing leaf springs. In this machine the load that the spring will carry with each inch of deflection, or fraction thereof, is shown on the dial and if it settles under the load and takes permanent set this is plainly seen. A whole spring can also be continuously deflected, any given distance, and again released until a breakage occurs, and the number of deflections will be recorded on a counter. This fatigue test of springs is an important one, as improperly heat-treated springs will not withstand near as many deflections, or last as long in service, as those that are correctly hardened and tempered. A microscopical examination of the metal where the spring leaves, or plates, are broken often reveals the fact that the steel was overheated or crystallized while the spring was being fabricated. On the other hand if the spring plates are not heated to a high enough temperature for the hardening operation the steel will be too soft and the spring will settle when put into service.

In testing springs with a 2-in. deflection, I have seen such springs settle 1¾ in. before they had been deflected 20,000 times, while breakage did not occur until they had been deflected over 350,000 times. At 100,000 deflections the settling had reached 2¼ in., that is, the distance from a straight line through the center of the eyes, at each end of the spring, to the top of the

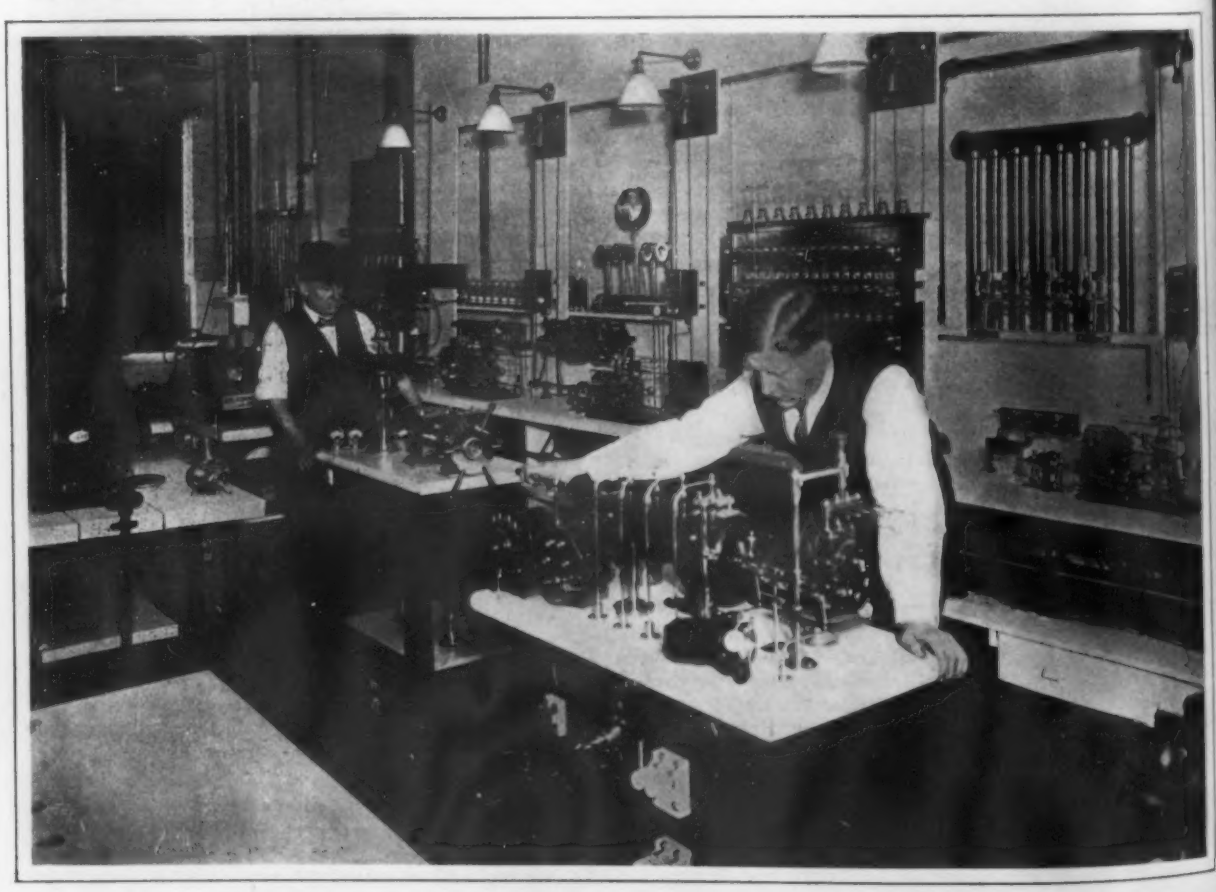


Fig. 9—Testing Electrical Apparatus for Automobiles

nter was 2¼ in. ss than it was fore the test as started. This ould suspend an tomobile body ¼ in. lower than was intended to over that par- cular spring and estroy most of s riding proper- es. This ac- unts for the lop- ded appearance at automobile odies often have.

In Fig. 6 is own the Shore leroscope at ork testing the rdness of gears. e operator is king a hardness ading on each oth around the eriphery of the ar. The hard- ss number will dicate whether not the correct mperatures were used in hardening and tempering e gear. If the hardness number, taken from each oth, is approximately the same, it will show that e gear was uniformly hardened all over.

In Fig. 7 is shown the machine for testing bearings. e load which the bearing carries in service can be plied and the bearing run with this load until it fails show its length of life. The amount of wear, per mber of revolutions, can also be taken at any time and life computed from this or its behavior noted. The d can be increased beyond the normal to see how bear- gs would act with an overload or the speed of rotation n be increased to see how the metal or alloy with- nds the heat caused by friction. It is provided with arts to record the results of tests. Behind the machine e hung springs to await their turn in the spring testing achine.

Fig 8 shows the power plant of an automobile that undergoing various kinds of tests. The stand, on ich the power plant is fastened, has a track running ong its side. On this can be wheeled in place, on eir respective cars, the different kinds of apparatus at are required to make the various tests. Thus dif- rent kinds of brake tests can be given the one engine th very little labor and other tests are as readily ade.

In addition to the regular tests that are made on andard machines or apparatus, special apparatus is ten constructed to make tests that are not provided on the regular machines. These tests are made as ar the workable conditions of the material under test it is possible to make them. Just before my visit, fferent makes of rubber tires were tested to destruction a very ingeniously devised special machine, if it may so called, in order to decide which tire would wear e longest and give the best service when in use on the r. The tires were loaded with their normal load by eans of levers and weights and were run on drums on hich were fastened blocks that were staggered at dif- rent angles to the edge of the drum. These would hit e tire when in motion, in practically the same manner stones or other obstructions in the road hit the tires a moving automobile. The speed of the tire was ster than is maintained in actual service and the sistance to stresses was more severe in order to shorten e time of the test. Very satisfactory results were ob- ined, however, in spite of the fact that the test nearly ook down the floor above. It is to be regretted that s apparatus was partially torn down before a photograph uld be taken.

In Fig. 9 will be seen the room in which is tested e electrical apparatus that is required for the equip- ment of a modern automobile. The numerous instru- ments and devices that are produced for starting, spark- ing, lighting, heating, etc., make this room an important part of the laboratory and two electrical engineers are kept busy continuously. Equipment for the different shops of the company is also investigated and tested in this department.

By Fig. 10 is shown the special apparatus that was rigged up for testing the endurance, power, etc., of some electrical self starters for the power plant. In this, as in all other materials, the different kinds are given various tests before a decision is made as to which is considered the best for the particular type of pleasure car or commercial vehicle on which it is to be installed. When the decision is once made it goes on all the cars of that type that are manufactured and it remains a part of that car until positive proof can be obtained that something else is better.

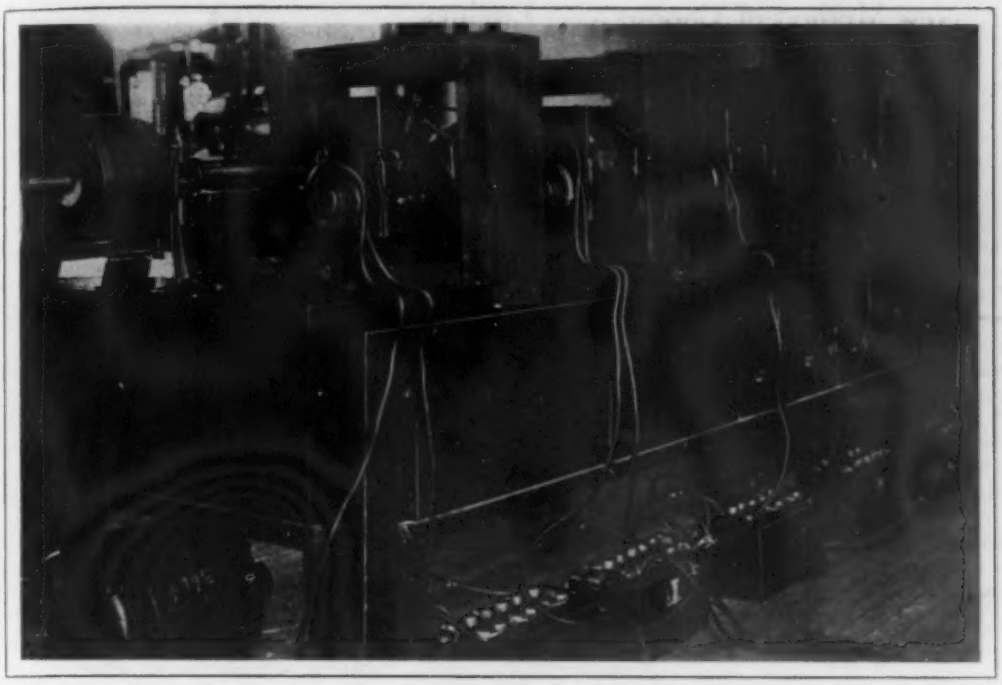


Fig. 10—Testing a Number of Self Starters for the Motor

New Seamless Tube Plant Near Pittsburgh

The Fownes interests, German National Bank Build- ing, Pittsburgh, will secure in a few days title to 65 acres of land at Economy, Pa., near Pittsburgh, and about one mile west of the large bridge shops of the American Bridge Company at Ambridge, Pa. On this site they in- tend to erect a large plant for the manufacture of seam- less tubing to cost $500,000 or more, and it is expected to give employment to upward of 400 men. No plans have yet been made for the buildings or equipment, but work on these will start soon after the property is se- cured. The Fownes interests were the original owners of two Carrie furnaces at Rankin, Pa., which were sold some years ago to the Carnegie Steel Company. They then erected a blast furnace and by-product coke oven at Midland, Pa., which were turned over last year to the Crucible Steel Company of America, and which are now being operated in connection with the open-hearth steel plant of the Pittsburgh Crucible Steel Company. The Fownes interests have owned for some years about 600 acres of coking coal lands at Denvo Station, near Browns- ville, Pa., on which they have built 236 beehive coke ovens, some of which are expected to start up this week, operating under the name of the Reliance Coke Company.

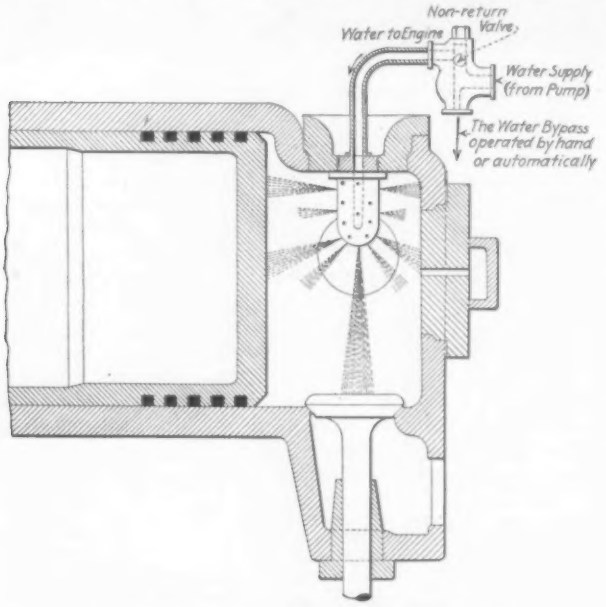
The American Car & Foundry Export Company, re- cently incorporated in Delaware with $500,000 capital, is to conduct the foreign business of the American Car & Foundry Company. The export company will establish a branch in London and possibly in other European cities, as well as branches in South America, where there is a growing business. Organization will be completed this fall.

A New Method of Cooling Gas Engines*

Injecting Water Into Combustion Chamber Making Water Jacketed Cylinder Unnecessary

BY PROF. BERTRAM HOPKINSON

If water can be injected internally against the surfaces needing cooling in a gas engine, the heat is removed on that side of the metal on which it is generated, and therefore there is no heat flow through the metal and no difference of temperature between the inner and outer surfaces. The water may be distributed by means of jets so that each part receives it in proportion to the rate at which it receives heat from the hot gases. Thus the engine can be maintained at substantially the same temperature all over and the stresses due to unequal heating may be eliminated. A simple single-walled casting can be used for the cylinder, resulting in a great saving in weight and cost and in improved reliability on account of the elimination of casting stresses. The arrangements for cooling the piston, which are necessary in large engines, can be dispensed with—a point of great importance, because these arrangements, besides being costly, frequently give trouble, and their failure may easily result in wrecking the engine. Finally, pre-



Section of Cylinder With Water-Injection Rose

ignitions are entirely prevented, for even a thick deposit of carbon, being cooled by the projection of water against the surface into which the heat flows, is kept at a temperature much below that full red heat which is necessary to fire the charge.

What Is Required in Cooling by Injected Water

The idea of introducing water into an internal combustion engine is not new. It is a common practice in oil engines to introduce water along with the oil in order to enable the compression to be raised, and water has been sprayed into gas engines for the purpose of preventing pre-ignition. Proposals have also been made to introduce water for the purpose of cooling parts of the metal. None of the latter, however, has been a practical success, if indeed they have ever been more than suggestions on paper, apparently because their originators did not appreciate the conditions which must be satisfied if the injected water is to act as an effective cooling agent. Of these the most important is that the water must be projected in comparatively coarse drops or jets directly against the surfaces to be cooled, so that it reaches these surfaces in the liquid form without much loss by evaporation on the way. Further, it must be distributed properly, so that each portion of the metal receives water in the proportion in which it receives heat. If the water be turned into steam before reaching the metal, it will not exert any cooling effect except indirectly by lowering the temperature of the flame, and such lowered temperature is accompanied by a considerable loss of efficiency.

By the method of internal injection described in this paper cold water is injected through a hollow casting projecting into the combustion chamber and provided with a number of holes or small nozzles about 1/32 in. in diameter. The jets so formed are comparatively coarse, so that even when projected into the flame the water reaches the part of the wall against which it is directed with but little evaporation on the way. The jets are directed to all parts of the surface of the combustion chamber and against the face of the piston.

The projection of liquid water against the walls and the proper distribution of that water are the first essentials of effective cooling by water injection; but there are other conditions which must be satisfied in order that the system may be a practical success. It is the experience of all who have had much to do with gas engines, that whenever liquid water has by accident or design been allowed to accumulate on the inner surface of the cylinder, it has been found to have very deleterious effects. Most producer gas contains a certain proportion of sulphur dioxide. This dissolves very readily in cold water, forming sulphurous acid which rapidly corrodes any metal surface with which it may be in contact. Thus, if the cylinder walls are allowed to become and remain wet, they are rapidly destroyed by corrosion. Even when the gas does not contain sulphur dioxide, liquid water spoils the working of the engine by washing away the lubricant.

How Internal Corrosion Is Prevented

When the author first began to consider the use of internal injection as a means of cooling, these difficulties of corrosion and lubrication seemed to be an insuperable bar, until it occurred to him that they could probably be overcome by the simple device of regulating the amount of water injected in such a way that the temperature of the whole of the engine is kept well above 100 deg. C. Under such conditions—which, of course, are only rendered possible by the absence of all external water cooling—every drop of injected water is boiled when it reaches the walls, and no liquid can accumulate. The large drops of water projected from the nozzles can dissolve but little gas on their way to the walls, for their surface is relatively small and they are only in contact with the gas for a fraction of a second. What little they do absorb is at once driven off when they strike the hot metal, because the water is almost instantly converted into steam. That corrosion may be completely prevented in this way has been proved by actual trials, of which further particulars are given later.

The practical application of this system of cooling has been much facilitated by a discovery made by the author soon after he began experimenting with it. It was well known from the experiments of Dr. Dugald Clerk, the author and others, that the rate of heat flow from the gas into the metal is far more rapid at, and soon after, the moment of ignition than at any other time. It seemed likely from these experiments that for practical purposes the heat flow into the barrel of the cylinder during the last three-fourths of the expansion stroke might be so small compared with that in the first period that direct cooling of this portion of the cylinder could be dispensed with altogether. This anticipation has been found to be correct. It is sufficient to inject water on to the surface of the combustion chamber and the head of the piston only, the whole of the cooling of the barrel being effected by conduction into the piston which is itself kept cool by the projection of water on to the head when it is near the inner centre. This, of course, is the opposite of what occurs in a jacketed engine, in which the heat flows from the piston into the jacketed barrel. By taking advantage of this fact, the application of water is confined to places where it can do no harm, none falling on the sliding surfaces. This is a point of some importance if the water contains much dissolved matter. The experimental engine described below has been worked for some thousands of hours and is now working with a very hard water containing about 0.85 g. of salts to the litre (21 grains to the gallon), so that the surface of the combustion chamber and the face of the piston have become thickly incrusted with salts. Yet no trouble whatever has arisen, because no water has been allowed to fall on the sliding surfaces. The absence of

*From paper presented before the Institution of Mechanical Engineers, Cambridge, England, July 29.

pre-ignition under such conditions is also noteworthy and shows the efficiency of this method of cooling.

Trials of 50 Brake Horsepower Engine

In order to put these ideas to a practical test, a Crossley engine, 11½ in. diameter by 21 in. stroke, rated at 40 brake horsepower (with coal gas) at 180 r.p.m., was fitted with a new cylinder consisting of a plain barrel without any water jacket. The valve motions were retained, and the valves and the shape of the combustion chamber were the same, the only change being the removal of all external water cooling.

A section of the new cylinder with water injection rose is shown in the accompanying drawing. The injection rose is a hollow casting, projecting into the combustion chamber. There are about twenty-five holes in the rose, each 1/40 in. in diameter, and the jets proceeding from these are directed as shown against all parts of the combustion chamber and piston head. There is no jet on to the exhaust valve, as it has been found that the drip from the rose is sufficient to keep this cool. The water is injected by a simple plunger pump of the same kind as that used for the injection of fuel in Hornsby oil engines. It is driven by a cam on the valve shaft, whereby a charge of water is injected once in a cycle. The pump stroke commences about 30 deg. before and finishes about 30 deg. after the point of ignition, so that water only goes in at a time when practically the whole of the sliding surface of the barrel is covered by the piston.

Immediately after erection with the new cylinder, the engine was run continuously for 120 hr. on an electrical load with coal gas. Continuous observation was kept of the gas consumption and of the load. The engine developed during this period 43 brake horse-power on the average, and ran very smoothly and steadily. The average mean effective pressure was 101 lb. per square inch. When jacketed, the engine would not develop more than 40 brake horse-power continuously without overheating, and mixtures giving a mean pressure of more than 100 lb. per square inch produced excessive maximum pressures (over 500 lb.) with violent thumping explosions. The reduction in maximum pressure, under these circumstances, by water injection is over 100 lb. per square inch, and the effect is very marked, the explosion becoming almost inaudible. This effect of the presence of steam in the explosive charge is, of course, well known, but the quantity of steam formed in an engine cooled in this manner is so large that it constitutes a substantial advantage of the method. It will be noticed that the formation of the steam does not involve any thermodynamic loss, such as occurs when water is sprayed into the cylinder in an atomized condition and evaporated before reaching the walls, since the heat used is that which would otherwise be wasted in the jacket water.

The quantity of water used on this trial was on the average 102 lb. per hour, equivalent to 2.4 lb. per brake horse-power hour. The temperature of the engine varied from 150 deg. to 180 deg. C. No water was visible on the piston or the spindles of the valves, and when the engine was stopped at the end of the trial the inside of the combustion chamber was found to be perfectly dry.

The engine consumed in this trial 15 cu. ft. of Cambridge coal gas per brake horse-power hour reckoned at atmospheric temperature and pressure. This is approximately the same as it burnt when developing the same power for short periods when jacketed. Tests at other loads have shown that with a weak mixture the gas consumption is slightly increased by the water injection, but with very strong mixtures it is a trifle less. The difference, however, does not exceed 5 per cent. either way, and on the average it may be said that the economy is unaffected by the use of this method of cooling.

Reliability and Wear Under Ordinary Working Conditions

After the trial just described, the engine was put to drive a dynamo in a factory engine-room. Its speed was increased from 180 to 195 r.p.m. It was left in the hands of the ordinary engine-room staff for several weeks, and was worked continuously for long periods of time at excessive loads. During this time it developed at times 50 brake horse-power with coal gas for several hours together —an increase of 25 per cent. on the maximum continuous load which it could safely carry when jacketed. Since then the engine has been brought to Cambridge, and is now engaged in regular service with a suction producer driving the workshops and producing electric current for the engineering laboratory. It is left to itself like an ordinary gas engine, giving no trouble at all, and has now been in regular work for two years, the total time of running being 5000 hr.

Anthracite coal is used in the producer, and this coal contains a considerable proportion of sulphur. Yet there has been no trace of corrosion in the engine. That the corrosion would be rapid if liquid water were allowed to accumulate is shown by the experience with the nozzles in the injection rose. These nozzles are, of course, continually in contact with water, and were at first found to corrode away rapidly. After many trials a suitable material has been found which lasts very well. Some corrosion has been observed at the bends of the exhaust pipe where the gases impinge on the metal, and corrosion in the exhaust pipe is also liable to occur at any place where water can accumulate. This, however, is not serious or rapid, and such as it is can easily be avoided by suitably arranging the pipe.

Discussion of the Paper

Engineer Rear-Admiral E. Little said that if the method suggested proved successful there would be hardly any limit to the size of cylinder, but he feared there might be difficulty in the application of the system to vertical cylinder engines. In a case of which he had experience the introduction of the water into the cylinder had the effect of grinding away the cylinder jackets at the top end to such an extent that they had to be replaced. The reason was understood to be that the salts in suspension in the water which had been injected acted as grinding material.

Michael Longridge thought that it was in the field of the large gas engine that cooling by the injection of water should prove very valuable. It should be of value also in the smaller engines by making them cheaper, and probably a little more economical in working. With regard to the injection rose, it was a question if it would not tend to clog, and prevent the proper distribution of the water. Then the effect on the ignition had to be considered. Was there not a risk that the sparking plugs might get a deposit of lime upon them and become ineffective?

Dr. Edward Hopkinson said that water was not injected on to the sparking plug.

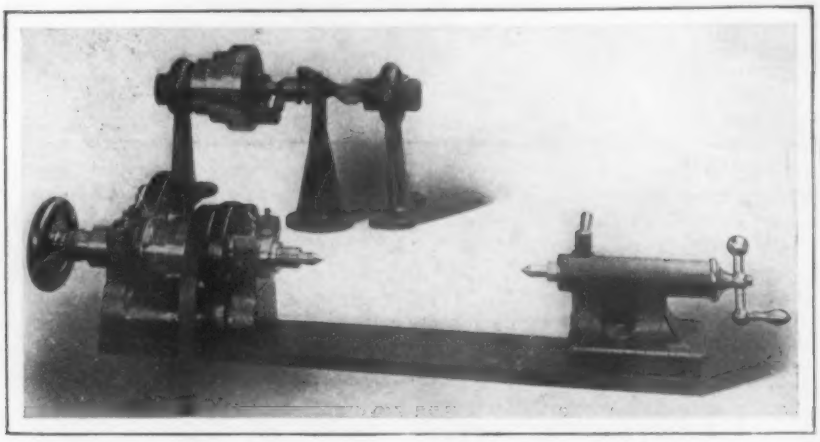
Professor Hopkinson, in replying on the discussion, agreed that the small engine could not be touched at present by this method, although it might be applied to it in the future. The engine was a two-cycle engine, and of a type which has ordinarily to be water-cooled.

The Speed of the Machine in Tensile Tests.—The question is often raised whether a variation in the speed at which a testing machine is run has any effect on the indicated tensile strength of the steel. The report of investigations at Woolwich Arsenal, England, bearing on this point runs as follows: Tests were carried out at different speeds, one set in a Whitworth hydraulic testing machine, and another in a Maillard testing machine. The experiments were arranged to be as nearly as possible on similar lines otherwise and the results were averaged. The conclusion arrived at was that, for steels of the quality under consideration, small differences in the speed of breaking specimens, such as might obtain in ordinary practice with reasonably careful manipulation, had little, if any, appreciable effect in the value of yield point, breaking load or elongation.

A paint that is applied to the surface and then baked, and which is said to be a new rust-proof coating, has the following ingredients: Linseed oil, 25 parts; calcium resinate, 36 parts; manganese borate, ½ part; lead acetate, 1 part; naphtha, 12½ parts; artificial graphite, 25 parts. The article is baked at 300 deg. F. for one hour and 40 minutes and the coating is stated to be highly lustrous and resistant to corrosion. No other form of graphite is said to give satisfactory results.

A Bench Lathe for Winding Small Magnet Coils

For such work as winding magnet coils, the W. P. Davis Machine Company, Rochester, N. Y., has developed a bench lathe. Although the machine was built for winding magnets for the electric starting devices used on automobiles, it may be available for similar work as may suggest itself on noting the details.



A Recently Developed 11-In. Back Geared Bench Lathe for Winding Magnet Coils

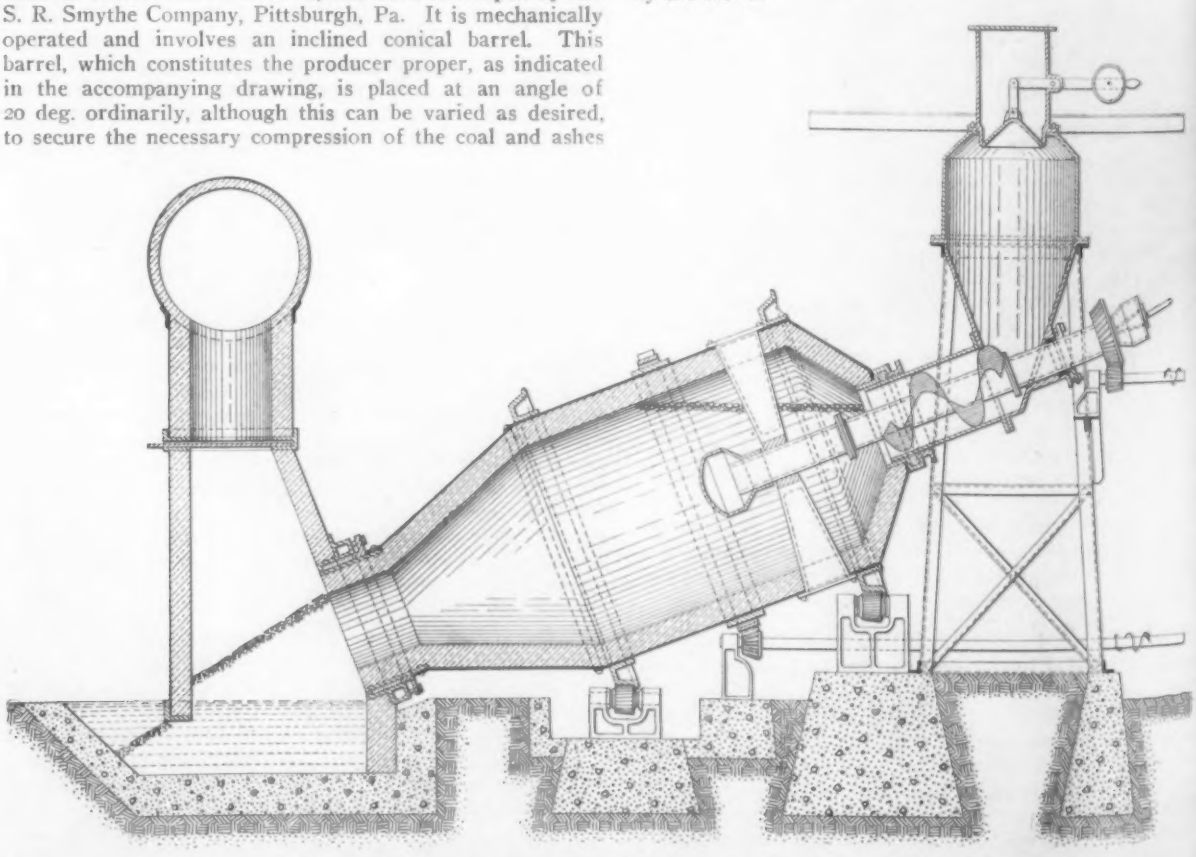
As indicated in the accompanying illustration, the lathe has a back-geared head with a left-hand thread on the spindle nose. For starting the work, and making necessary corrections a handwheel is fitted to the rear end. The spindle runs away from the operator and is driven by a countershaft placed on a bench at the rear of the lathe. A friction clutch is located in the cone pulley adjusted so that it will slip when a brake consisting of a strap running over the large step of the cone pulley is applied by depressing a foot treadle. The lathes are built in four sizes, ranging from 11 to 18 in., the smallest being the one illustrated.

An Inclined Mechanical Gas Producer

A gas producer, in the construction of which several unusual features are embodied, has been developed by the S. R. Smythe Company, Pittsburgh, Pa. It is mechanically operated and involves an inclined conical barrel. This barrel, which constitutes the producer proper, as indicated in the accompanying drawing, is placed at an angle of 20 deg. ordinarily, although this can be varied as desired, to secure the necessary compression of the coal and ashes for the discharge of the latter at the smaller end. The barrel is revolved upon rollers and is driven by some mechanical means, such as an electric motor or worm and worm wheel.

The coal is fed to the producer through a double hopper at the high point, at the right of the accompanying drawing, giving a double seal to prevent the escape of smoke and gas. A hollow worm feed with motor or other mechanical means projecting into the interior of the producer is located at the base of this hopper. Steam and air are introduced through the worm, which has a blast distributor secured to its end. It is possible to revolve the worm in one direction and the producer in the opposite one, or both can move in the same direction if desired. The use of the revolving barrel in conjunction with the incline at which it is adjusted, and the worm feed, the speed of which can be varied, is calculated to keep the coal and ashes solid, that is, without open zones. In passing out of the producer, the gas passes through a certain amount of ashes, which will generally be hot enough to convert the tar into gas and consume the soot, an arrangement which is relied on to produce clean gas. It is pointed out that in this way the troubles encountered in producer operation due to the accumulation of soot and tar are done away with, among which are the necessity for providing large conduits for the passage of the gas and the labor and time required for cleaning them.

The joints at which the barrel connects to the double hopper and the gas outlet are water cooled and sealed. Emphasis is laid upon the fact that due to the revolution of the producer a uniform blast distribution is secured, and the steam and air passing through the hollow worm and blower keep them cool and prevent the heat caused by the combustion of the coal from destroying them. The gas outlet or pan is water sealed where the ashes are discharged in the usual way. In operation, the ashes and coal are continually agitated and are worked forward to the discharge end by gravity assisted by the pressure supplied by the worm.

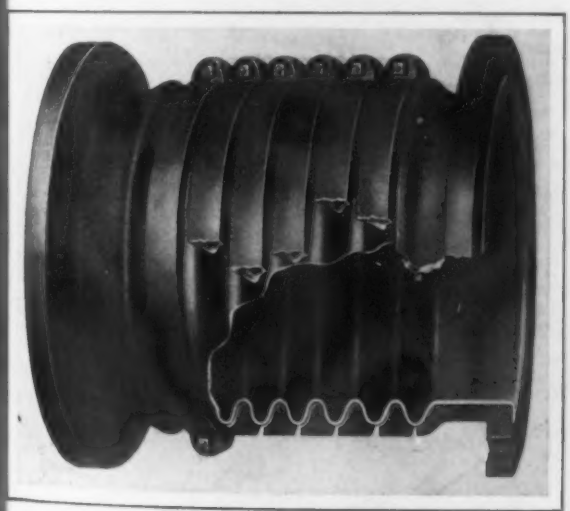


Sectional Elevation of a Recently Developed Inclined Mechanical Gas Producer

Test of a Pipe Expansion Joint

A recent commercial test was made on one of the self-equalizing pipe expansion joints made by the E. B. Badger & Sons Company, Pitts street, Boston, Mass. This test was intended to approximate conditions encountered in actual working. This joint, an illustrated description of which appeared in *The Iron Age*, June 5, 1913, is of copper, corrugated for strength and for taking up the changes in pipe lengths. The external rings fitting the corrugations are to add strength to the joint and distribute the change of shape, each ring forcing a part of the change to the next, so that the strain is divided among the corrugations instead of being taken by one or two. A view of the arrangement of the corrugations and the external rings is presented in the accompanying engraving.

The joint tested was a large one, being 20 in. in diameter and 23¼ in. long between the flanges, with seven corrugations or depressions. To have the joint heated to approximately the working temperature, it was filled with steam at about 5 lb. pressure. In making the test the joint was secured at one flange and shortened the desired amount by bolts, the joint being shortened in this way, as it would be when squeezed together by the increase in the length of two lines of pipe. In the first test, the joint was shortened 2 in. The individual corrugations contracted, those in the middle taking most of the change of shape, but all helping the percentage of contraction varying from 2.1 for one end to 24.4 for one of the middle corrugations. In the second test, the bolts were released and the joint brought back as nearly as possible to its original position after which it was again contracted 2 in., the maximum contraction in this case being 18.3 per cent. The third test, which was merely a repetition of the preceding ones, gave a maximum contraction of 24.4 per cent., for the same ring that had the maximum contraction in the first test, while the end ring, which did not contract in the other tests, showed a contraction of 2.1 per cent. In the fourth test, the range of contraction varied from 2.1 to 21 per cent. In the fifth test, the flanges were drawn together to give a total over-all measurement of 20½ in., which showed an additional contraction over the previous test of from zero to 8.2 per cent. After the tests were completed, the



View of a Corrugated Copper Expansion Joint with a Portion Broken Away to Show the Construction

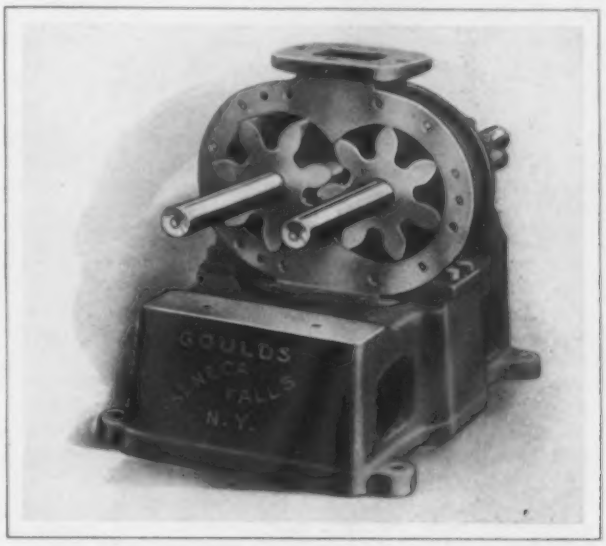
flanges were expanded to the original dimension, 23 in., and the various rings measured. This showed that the maximum variation from the original measurement was only 2/32 in. in two of the rings, while two showed no variation, and the remaining three showed a variation of 1/32 in. In every case the end rings contracted less than those at the center, showing how the distributing rings push the strain toward the center of the joint.

Bolckow, Vaughan & Co., Ltd., Middlesbrough, England, have placed with Bagley, Mills & Co., London and New York, agents for Carl Still, of Recklinghausen, Germany, a repeat order for a complete benzol plant and extensions to the company's rectification plant.

A Rotary Power Pump with Gear Type Impellers

The substitution of gear style impeller cams for the three-toed ones ordinarily used is the distinguishing feature of a new rotary power pump that has just been developed by the Goulds Mfg. Company, Seneca Falls, N. Y. Another feature is the elimination of the gears on the end of the camshafts.

The pumps are mounted on a cast-iron bedplate, fitted with an outboard bearing and tight and loose pulleys for belt drive. The suction connection is made within the base



View of the Pump Chamber of a New Style of Rotary Power Pump Showing the Gear Type Impellers Which Have Been Substituted for the Three-Toed Cams Formerly Employed

directly beneath the case and is reached through handholes in the base. Two sizes of pumps are built, one having a capacity of from 25 to 50 gal. per min., at from 225 to 450 r.p.m., while the capacity of the other is double at the same speed. In the smaller pump, there are two discharge openings, one tapped for pipe and the other threaded for hose couplings, while the larger pump has three discharge openings, two fitted the same as in the smaller pump, while the third has an interchangeable blank flange. The discharges are for 1½ and 2 in. pipe or hose, respectively, the suction being twice that size. The pumps are intended for pressures up to 100 lb. or a head of 230 ft.

Dodge Mfg. Company's Outing

The seventh annual field day of the employees of the Dodge Mfg. Company, builder of power transmission, Mishawaka, Ind., was held August 9, at Springbrook Park, South Bend, Ind., and brought together several thousand people. The company chartered special cars and furnished free tickets to all the park amusements. An elaborate programme had been prepared, which was opened at 8 o'clock by an automobile parade to the park in which the 25-year men of the company and their wives participated, with William B. Hosford, first vice-president, at the head. The day was one of more than ordinary interest to Mr. Hosford as it represented his 71st birthday and 39th year as a Dodge official. As a token of appreciation and esteem he was presented with a traveling bag by fellow workers. As a souvenir of the day the Dodge advertising department issued a complete newspaper of 10 pages, 8½ x 11 in., profusely illustrated and containing messages of good cheer, prose and verse from such men as Governor Ralston of Indiana, United States Senators Shively and Kern, Vice-President Marshall, former Vice-President Fairbanks, Frank L. Stanton, Wilbur D. Nesbit and others, takeoffs on employees, etc.

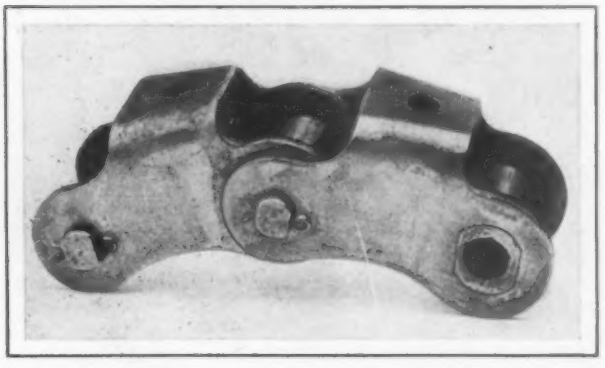
The American Institute of Chemical Engineers, of which John C. Olsen, Polytechnic Institute, Brooklyn, N. Y., is secretary, has issued Volume V of its Transactions, covering the addresses and papers read before the Institute in 1912. The publication comprises 284 pages and is for sale by the D. Van Nostrand Company, New York.

A New Type of Stamped Transmission Chain

For use where malleable chains are now employed for the transmission of power, and the elevating and conveying of materials, the Union Chain & Mfg. Company, Seville, Ohio, has brought out a new type of chain made from sheet steel, each link of which is formed with its two sides in one piece. Each link consists of but four parts, the two sides in one piece, the tube or bushing, the connecting pin and the cotter pin. In the chain no riveting is required, the connection between the links being accomplished by a tube fitting into holes in their ends, in which a shouldered connecting pin is inserted and held in place by a cotter pin. This type of construction incidentally is counted on as giving a joint that is practically dustproof. When the tubes and the pins, both of which are case-hardened, become considerably worn, they can be turned around 180 deg., to bring the unworn sides into service and restoring the original pitch of the chain. When the tubes and pins are entirely worn out, it is possible to replace them with new tubes and pins, the links still remaining good for use.

A view of two links of the chain is here given. The holes in the bridges of the chain are intended for a number of different purposes, thus doing away with the necessity, in many cases, of purchasing attachment links at an extra cost. It is also possible to shorten or lengthen the chain quickly by one link, as every link is a connecting one. Emphasis is laid on the fact that with this chain, a plain faced wheel can be substituted for an idler sprocket, the bridges working like a belt and relieving the tubes of any extra wear.

In the manufacture of this chain, economy is promoted by blanking both the links and the tubes and punching the holes, all in one operation. The tube blanks are



A New Type of Transmission Chain in Which the Links and the Bushing Are Stamped from Sheet Stock in One Operation

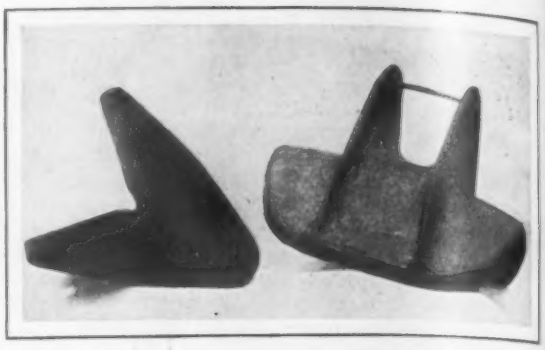
stamped from that part of the stock lying between the ends of the link blanks, thus reducing the waste to a minimum. The chain can also be supplied in the roller type, and higher grades of chains are to be manufactured for use in automobiles, motorcycles, machine tools, etc.

Protectors for Handling Heavy Finished Castings

In lifting heavy finished castings the edges are frequently damaged by indentation from the chain slings and more seriously by the slipping of such slings. If rope slings are used instead these are in turn soon destroyed by the sharp edges of the castings. The accompanying illustration shows a protector designed and furnished by the Hess Steel Castings Company, Bridgeton, N. J., in several sizes.

The protector is a casting consisting of two plate members at right angles to one another and a pair of stiffening ribs. The chain or rope rests between these ribs, between which the casting is thickened and rounded to give a good seat and prevent damage to the sling. The ribs are carried far enough back to receive a cotter pin, which insures the protector always being in the sling when wanted instead of in some corner or under a bench. Provision is made against damage to a sharp edge on a finished casting or machine by running a groove lengthwise of the protector at the juncture of the two plates.

The protectors are made of a low carbon alloy, practically pure wrought iron, it is emphasized. This, being



PROTECTORS FOR HANDLING, AS BY CRANE, FINISHED CASTINGS

View to the left shows the protector end on, a plain straight-face casting, with a slot at the intersection of the surfaces to prevent injury to edge of piece protected; the view at the right shows the cotter pin arrangement to hold protector on rope slings.

ductile, is counted on to eliminate the danger of the protectors being broken by even rough handling. Where very great delicacy in handling is called for, protectors with a babbitt or lead lining are furnished. This may be renewed as it becomes worn or changed with chips, etc. Suitable pouring dies are furnished if desired.

Papers for the Brussels Iron and Steel Meeting

The autumn meeting of the Iron and Steel Institute will be held at the Palais des Académies, Brussels, Belgium, September 1 to 4, 1913. The following is the list of papers that are expected to be submitted:

Armand Baar, Liége: "Reinforced Pile Foundations for Blast Furnaces."

E. D. Campbell and F. D. Haskins, University of Michigan: "Some Experiments of the Effect of Heat Treatment on the Colorimetric Test for Carbon in a 0.32 Carbon Steel."

Prof. A. Campion and J. M. Ferguson, Glasgow: "A Method of Preparing Sections of Fractures of Steel for Microscopic Examination."

Baron E. Coppée, Brussels: "The Manufacture of Coke in Belgium."

Gen. L. Cubillo, Madrid: "The Manufacture of Armor-Piercing Projectiles."

Otto Frick, Beckenham, Kent: "The Electric Refining of Steel in an Induction Furnace of Special Type."

Emil Gathmann, Baltimore: "Commercial Production of Sound Steel Ingots."

Gevers-Orban, Liége: "The Distillation of Tar in Metallurgical Practice."

E. Houbaer, Liége: "The Use of Coke-Oven and Blast-Furnace Gases in Metallurgy."

Prof. H. Hubert, University of Liége: "Present Methods of Testing with Special Reference to the Work of the International Association for Testing Materials."

Baron E. De Laveleye, Brussels: "A Historical Survey of the Metallurgy of Iron in Belgium."

F. Rogers, Sheffield: "So-called 'Crystallization through Fatigue.'"

Prof. A. Sauveur, Cambridge: "The Allotropic Transformations of Iron."

Dr. J. E. Stead, Middlesbrough: "A New Method for the Determination of the Critical Points Ac_1 and Ar_1."

Dr. J. E. Stead and Prof. H. C. H. Carpenter, Manchester: "The Crystallizing Properties of Electro-Deposited Iron."

Benjamin Talbot, Middlesbrough: "Modern Open-Hearth Steel Furnaces."

Gustave Trasenster, Ougrée, Belgium: "The Use of Oxygen in Blast Furnaces."

C. Vattier, Valparaiso: "Note on the Principal Deposits of Iron Ore in Chili."

The Multiple Unit Electric Company has removed from 136 Liberty street to 133-7 East Sixteenth street, New York. New equipment will be installed at the new quarters for a larger production of the company's electric furnaces and heating appliances. An improvement has been made in the original furnace in the air cooling of the electrical connections and placing them farther away from the heat zone. This makes it possible to remove a heat unit without disturbing the furnace proper. O. A. Enholm has been appointed general manager, with supervision of office and manufacturing departments, M. M. Kohn having severed his connection with the company.

The American Hardware Manufacturers' Association will hold its twenty-fifth annual convention concurrently with the seventeenth convention of the National Hardware Association at Atlantic City, October 29 to 31, inclusive. Headquarters for both associations will be at the Marlborough-Blenheim. F. D. Mitchell, 1510 Woolworth Building, New York, is secretary-treasurer of the American Hardware Manufacturers' Association.

New Tensile Test Piece and Holder*

It Obviates Warping, Machining Difficulties and Other Drawbacks of the Usual Form

BY K. W. ZIMMERSCHIED

The standard 2-in. tensile test piece of this society, when made from steel with an elastic limit of 125,000 lb. per sq. in. or less, and when pulled as made, presents no particular difficulty. With the increased demand for accurate data on steels of much higher strengths, however, we have found this form difficult to use, for a number of reasons.

It has often been necessary to investigate the properties of a given steel under various heat treatments. In this case, it often happens that the stronger pieces of a series are too hard to machine without using heroic methods; threading of the ends becomes especially difficult. If, on the other hand, the test pieces are first made in the soft state and then treated, instead of treating the ¾-in. bar and machining afterward, a new set of difficulties arises. First, the quenching of finished pieces generally sets up high local strains in the threaded ends, especially when water quenches are employed. This can be obviated to some extent by protecting these threaded ends with a coating of asbestos, silicate mixtures or the like. Care must be taken, however, not to hold the butts too soft, or they will be too weak to withstand the load necessary to break the test length. In any case, oxidation of the threads will take place unless considerable precaution is taken to prevent it, and the resulting scale then makes it necessary to clean out the threads if close fits in the holder are to be obtained.

Aside from the machining difficulties, however, warping of the test piece during heat treatment is very troublesome. Suppose that a specimen is made up with 0.020 to 0.030 in. excess stock left on the diameter, to be ground

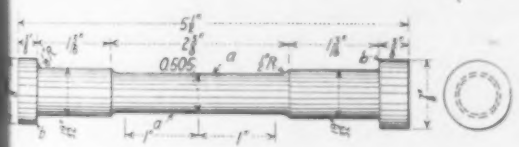


Fig. 1.—Dimensions of Test Piece.

after treatment. This specimen is almost certain to warp or bow up more or less on quenching. Grinding will straighten out the test length, but the butts will still be out of line, and if the specimen is pulled in the ordinary holders, the loading is certain to be more or less eccentric. It was to obviate all these difficulties that the test piece shown in Fig. 2 was designed. This is made from ⅞-in. or 1-in. round bar in the soft state, leaving 0.030 to 0.040 in. on the test length diameter, and on the face *b*. The advantages of this form from the viewpoint of machining cost is quite evident. Again, no ordinary heating or quenching operation will affect the specimen unfavorably, because of the absence of threads and of the fillets at all changes of section. After treatment, grinding of the test length and of the surface *b* with the same wheel will insure that, no matter how badly it is warped, the plane of load application will be normal to the axis of the specimen, and uniform in intensity, and a straight line pull will result. There are still minor irregularities in the testing machine to take into account. In order to care for these, and to provide a rapid and convenient method for changing test pieces, the holders shown in Figs. 2 and 3 were devised. With a few explanations these figures become almost self-explanatory. *a* is a sort of socket nut, which

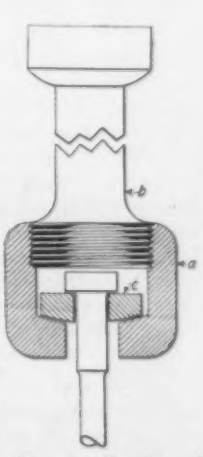


Fig. 2.—Details of Special Holder for Test Piece.

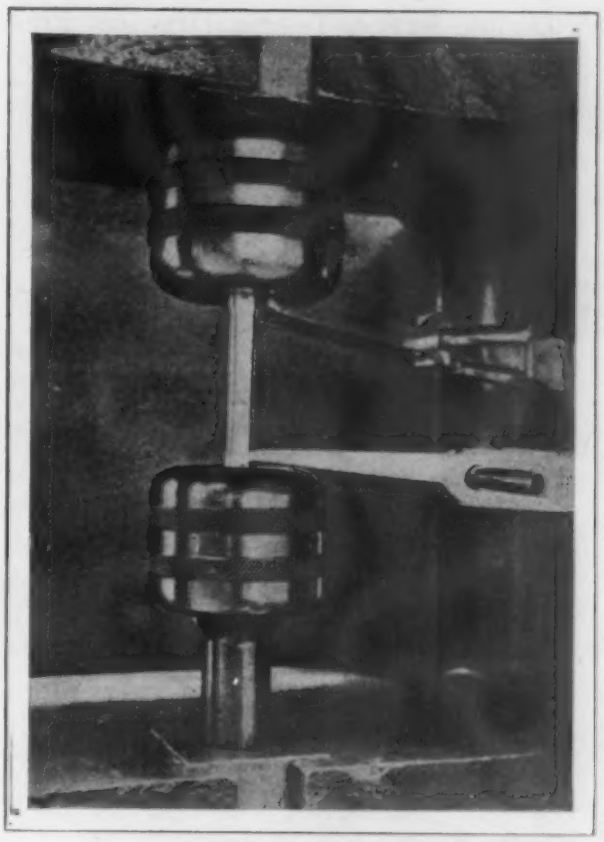


Fig. 3.—Holders for Test Piece, showing use of Extensometer in a Testing Machine.

screws on the end of the spherical headed bolt *b*, which latter bears in standard blocks in the test machine heads. The hole in the socket nut allows of slipping the butt of the test piece through. The split ring *c* is snapped on the shank and held with a rubber band; the nut is then screwed on to the main bolt. The operation is repeated on the bottom nut, and the piece is set ready to test.

As noted, the heads of both bolts *b* are ground in their sockets to a spherical bearing. The split rings are also ground to a spherical bearing in the socket nut. Thus there is an unusual linkage employed, which can be relied upon to correct whatever small irregularities may exist in the machine or in the test piece. It is also found that the fit between specimen and holder is so accurate and unyielding that extensometers may be applied directly to the holders, with no commercial error. This is illustrated in Fig. 3. The saving of time necessary to apply ordinary extensometer clips is a considerable advantage. It goes almost without saying that these holders are made from heat-treated alloy steel of high strength; in them test pieces have been broken at maximum strengths of over 300,000 lb. per sq. in.

Using this fixture on a large number of test pieces we find a very large percentage of the fractures showing perfect cups and cones, or stars perfectly centered—none bear evidence of a side pull. The test results are also more regular, duplicates agreeing considerably more closely than when using the old test pieces and holders. In conclusion, the writer would confess that the fundamental ideas in this note are based upon the constructions used in well-known German testing machines. The advantages in this new form of holder are chiefly from the standpoint of simplicity in manufacture and use.

The Michigan Electric Welding Company, Detroit, Mich., which a year and a half ago moved to its present location at 514 Hart avenue, having purchased the property, has just completed an addition practically doubling the floor space. Additional equipment has been installed which widens the scope of work undertaken. A steadily increasing demand has been found for automobile specialties, such as drag links, brake-rod assemblies, torsion rod assemblies, tie rods, brake expander cams, wire rings and hoops and welded gear rings.

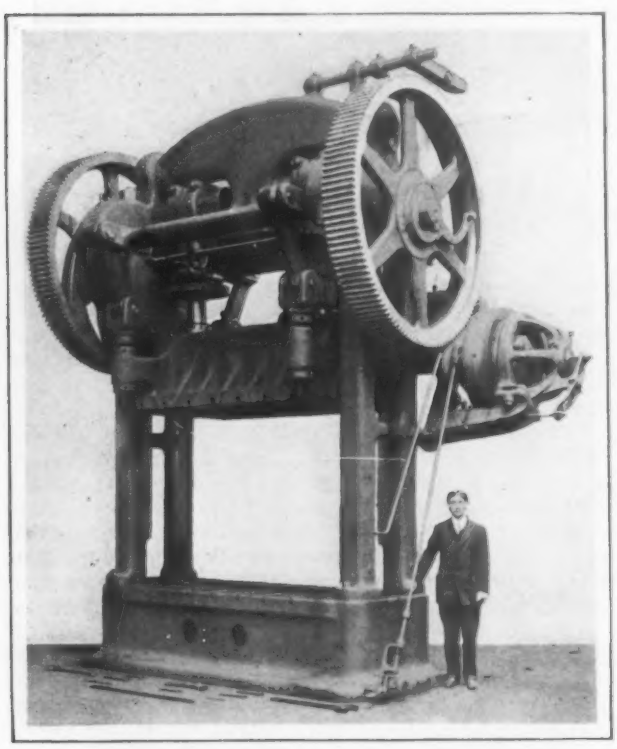
* A paper prepared for the summer meeting of the Society of Automobile Engineers.

A Double-Action Toggle Drawing Press

For the production of seamless work as deep as 15 in., the Ferracute Machine Company, Bridgeton, N. J., has developed a line of double-action toggle drawing presses. The general arrangement of the presses is similar to the one shown in the accompanying engraving, the main variation being in the parts affected by the width between the columns.

As will be noticed the bed is a massive casting with the customary T-slots for fastening the lower dies in position. As a precaution against flexure, the interior of the bed is trussed. The shaft, gearing, ram, etc., are supported by columns at each end of the press which are connected at the top by a heavy stay, four steel rods, 5½ in. in diameter, located one at each corner, taking the tensile stresses. The ram containing the blank-holding surface is driven by toggles, actuated by a cam groove in the large gear at the left, this being done through the medium of a yoke connected to the toggle shafts at the front and back of the press. This arrangement permits the ram to reach its lowest position and remain stationary, while the plunger completes the last half of its descending stroke and makes the first half of its upstroke, thus giving approximately 180 deg. of dwell to the blank holders.

The plunger is connected by two pitmans to the main or eccentric shaft, which is a high-carbon steel forging, 10 in.



A Massive Double-Action Toggle Press for Drawing Comparatively Deep Seamless Work

in diameter at the journals and 12 in. at the cranks. There is an additional bearing for this shaft in the stay which connects the columns. The stroke of the press illustrated is 16 in. for the ram and twice that for the plunger, these being the maximum for a press of this size. The adjustments of the ram and the plunger are 4 and 8 in., respectively. The hight from the bed to the ram at the top of the stroke and adjustment is 68 in., which, while greater than usual, is required for special work.

The press is driven by a friction clutch, which allows it to be started or stopped at any portion of its stroke. The clutch contains a double cone which is capable of a small amount of horizontal motion in two directions. When moved toward the left, it connects the revolving flywheel to the shafting and causes the press to make a stroke. Motion in the opposite direction severs the connection between the clutch and the flywheel, and coming in contact with a stationary brake, the press is stopped. It is possible to produce this action by a hand lever, or the press may be run automatically, being started by a treadle and stopping at the top of the stroke. If it is desired to give the operator control at all times through the medium of the hand lever, the treadle can be locked down and the press run continually.

A motor shelf is provided at the top of the press, which has a vertical adjustment for regulating the tension of the belt. It will be noticed that an outboard bearing is provided for the clutch shaft, supported by a large bracket firmly secured to the columns of the press at its upper and lower ends, thus making the frame of the machine complete within itself.

The following table gives the principal dimensions and specifications of the press illustrated:

Distance between columns, in.	100
Depth of bed, in.	56
Pitch diameter of large twin gears, ft.	7½
Face width of large twin gears, in.	12
Diameter of flywheel, in.	50
Face width of flywheel, in.	14
Weight of flywheel, lb.	3,000
Maximum depth of work handled, in.	15
Pressure exerted, tons	500
Approximate weight, lb.	135,000

In addition to this press, there are six other sizes built, two larger and four smaller.

Cost of Transportation to South America

Foreign merchants contemplating the purchase of American goods always want to know the cost of the article delivered, and the inability or unwillingness of American exporters to quote c.i.f. prices has lost them many orders. To assist exporters in ascertaining delivery charges, the Bureau of Foreign and Domestic Commerce has published a bulletin compiled by Commercial Agent F. J. Sheridan dealing with transportation rates to the west coast of South America, this section of the foreign field being selected because of the trade activity that is expected to follow the opening of the Panama Canal. The series of tables gives the freight rates on over 800 articles from inland points in the United States to inland points in Ecuador, Peru and Chile. Lighterage, transfer, and other charges at the port of New York and at South American ports are shown, together with the cost of marine insurance, and data are also given as to consular fees and regulations and steamship requirements. Comparative tables give the competitive rates from European ports and from New York to South America. Statistics are furnished to show the character of the goods sold by the United States to Ecuador, Chile, Peru and Bolivia. Tables of price comparisons give the equivalents in the currency and measures of these countries of prices stated in the money and measures of the United States. The bulletin, in short, is a compendium of practical information for the assistance of merchants who are engaged in the export trade or who contemplate entering the foreign field. Copies of the bulletin (Special Agents, Series No. 72) may be obtained from the Superintendent of Documents, Washington, for 10 cents each.

A successful method of melting borings is reported by W. S. Zimmerman in System. After a heat has been taken off and the bottom of the cupola is a mass of glowing coke, the blast is shut off and a ton of borings is shoveled into the cupola. In a few minutes the material melts into a pasty mass. When this condition occurs, the blast is turned on again, and in a few minutes, it is stated the charge is ready to be poured. It is run into grate bars or similar castings, or is poured into pigs and mixed with the scrap charge the next day. The method has been found more satisfactory, it is claimed, than boxing the borings, and has reduced the foundry costs $5 a day.

The Union Iron & Steel Company, Cincinnati, Ohio, has been appointed exclusive distributer in its territory for Toledo tool steels manufactured by Jno. Hy. Andrew & Co., Ltd., Toledo Steel Works, Sheffield, England, whose representative in this country is the Newman-Andrew Company, 107 West street, New York. C. F. MacKinnon, who was formerly with the Sheffield Tool Steel Company, Cincinnati (which concern now retires from business), is connected with the Union Iron & Steel Company.

The Goldschmidt Thermit Company, 90 West street, New York, announces the removal of its branch office from 432-436 Folsom street, San Francisco, Cal., to 349-351 Folsom street.

pid Determination of Nickel in Steel

A Method Which Insures Speed and Accuracy in Dealing with Chemical Solutions and Alloys

ercy S. Brown discusses very fully in the Metal In- for August a new method for determining nickel emical solutions and alloys, using an organic chemical ound known as dimethylglyoxime. Portions of the e are reproduced below. The author does not give ailed method applicable to the steel industry, but we very accurate one for the benefit of steel chemists. he author's attention was first directed to dimethyl- ime as a means of separating nickel and cobalt, by per written by O. Brunck in 1907. In this paper k gives credit to Tschugaeff for suggesting di- lglyoxime as a means of detecting the presence of and then explains the results of his investigations the value of the reagent as a means for the quanti- determination of nickel. When this method was proposed it had one fault, namely the high cost of imethylglyoxime; but recent experiments have shown he method is of great value, and with its application almost universal has come a reduction in the cost of eagent that places the new method at the command y one who wishes to use it. In October, 1907, k gave further information about the use of di- lglyoxime, and showed that by the use of a Gooch le he could get extremely accurate results. His ar- further elaborated the method and showed how it be applied to the determination of nickel in the nce of cobalt, zinc, manganese, iron, aluminum and ium. Brunck, in the aforementioned article, calls ion to the fact that the nickel can be determined in a dilute or strongly concentrated solution, and sug- the use of a 1 per cent. alcoholic solution of the hylglyoxime. A slight excess secures complete itation but theoretically four parts of the reagent are ed to precipitate one part of nickel. The nickel on which usually contains free acid should be heated beaker nearly to boiling and the reagent added. ammonia is added drop by drop until the solution s faintly of the ammonia. Filter through a Gooch le using suction.

runck's methods for the separation of nickel from metals follow: To separate nickel from cobalt one- gram of the sample is dissolved in HCl (or if a salt issolved in water) and the solution evaporated nearly yness. After diluting to 400 cc. with water add 0.2 dimethylglyoxime and 2 g. of sodium acetate. Filter allowing to stand one-half hour. To separate nickel manganese use sodium acetate to neutralize the acids d of ammonia. To separate nickel and zinc use ammonia or acetic acid, but preferably the latter. parating nickel and iron, to the solution containing n the ferric state, tartaric acid is added before pre- tion, to prevent the subsequent formation of ferric xide on adding ammonia. In the case of nickel and num the method is similar to that used for nickel ron. For separating nickel and chromium tartaric s added to prevent the precipitation of chromium by mmonia, but it is also necessary to have a sufficient nt of ammonium chloride present.

How to Recover the Reagent

is interesting to note that the dimethylglyoxime will nickel in a solution containing less than 1 part to 00 parts of water. The dimethylglyoxime may be re- ed from the nickel precipitate by carefully wash- and then breaking up the crystals, warming with sium cyanide until all is dissolved, filtering through ded filter and making acid with acetic acid. If pure rystals will be white, and if not they will have a red- tinge. In the latter case the crystals should be re- allized from alcohol with some charcoal present. tals should be dried carefully in any satisfactory man- and they can then be used for further determinations.

The Method as Applied to Steel

he following adaptation of the method to determin- nickel in steel has been successfully tried out and is and accurate:

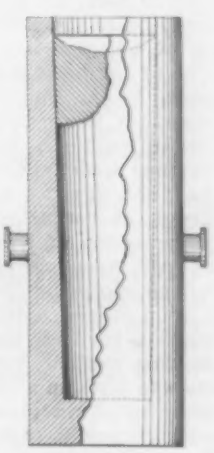
a No. 4 beaker one gram of sample is treated with 40 cc. of hydrochloric acid (1 to 1) and gentle heat is applied until the steel is all in solution. The iron is oxidized by adding 5 or 6 cc. of nitric acid (1.20) and boiling for a few minutes. The solution is removed from the heat and 50 cc. of a 20 per cent. solution (20 g. to 100 g.) of tartaric acid are added and the solution diluted to about 400 cc. Ammonia is then added until the solution is faintly ammoniacal, followed by 50 cc. of acetic acid.

The solution is then heated below boiling and for every per cent. of nickel present 10 cc. of a 10 per cent. (1 g. to 100 cc.) alcoholic solution of dimethylglyoxime is added, and the solution is then made faintly ammoniacal and allowed to stand over a low light for 15 minutes. The precipitate is filtered off on a dried and weighed filter paper and washed with hot water. The filter paper and precipitate are dried at 100 deg. C. for one hour and weighed between watch glasses. The precipitate contains 20.31 per cent. Ni.

E. F. C.

Jarring Ingot Molds to Prevent Piping

A patent has been granted to Horace W. Lash, Cleveland, Ohio, for an improvement in the process for making dense steel ingots. In his description the inventor says that of the many methods suggested to prevent piping and segregation the one that is considered most successful consists in subjecting the ingots to great pressure while the metal is freezing in the mold. This improves the quality of the steel to some extent, but it is unsatisfactory, he says, and it is a question whether the improvement is commensurate with the installation cost of expensive apparatus. He claims that the compression method only causes coalescing of the gas bubbles, thereby reducing the number and the size of the pockets, but that very little of the gas can escape. His process he terms "liquid forging" by which the gas is in a large measure withdrawn from the ingots. Mr. Lash says:



The Lash Method for Jarring Ingots.

"The process, as I regard the best method of practicing it, consists in putting the fluid metal in a mold of great strength and in then lifting the mold and dropping it upon a firm and substantially unyielding surface. This is to be done repeatedly while the metal is freezing. The inertia of the fluid, or semi-fluid metal during this period will, when the mold is suddenly stopped by the collision with the unyielding surface, cause the metal to settle down in the mold and close up the gas pockets. The gas, however, in the ingot is by this action of the metal caused to rise toward the unconfined top surface of the metal, and much of it escapes.

"In the practice of the process it is preferable to use open topped molds whose sides incline slightly outward, from bottom to top, whereby the mold is largest at its upper end. This gives greater freedom for the escape of the gas and also causes the application to the metal of some lateral pressure as the metal is driven toward the smaller lower end of the mold. This aids in expelling the gas, and in causing the lower end of the 'pipe' to close; so that when the ingot has solidified the 'pipe' has taken the form of a shallow basin in the top of the ingot. The frequent jarring of the freezing metal also minimizes the production of the so-called pine tree crystals and the like."

It is pointed out that if the mold be held and repeatedly struck violent blows against its bottom substantially the same results would be produced.

The Dodge Mfg. Company, Philadelphia, has received an order through the American Bridge Company for the Carnegie Steel Company for seven iron sheaves, all extra heavy, for rolling mill work. Their combined weight is estimated at 73,400 lb. The sheaves will be used in connection with Dodge rope drives and will be grooved for 1½-in. Firmus manila transmission rope.

Features of American Core Room Practice

A Comparison of Methods in French and American Foundries—Discussion of Core Binders, Core Baking and Core Machines

BY HENRY MARQUETTE LANE, M.E.

The present foundry and core room practice of the United States is the outcome of certain economic conditions existing in this country. The rapid development of the country and the relative shortage of labor have resulted in a high labor cost or wage paid to the individual worker. If a product is to be manufactured at a given cost for the finished article and high wages must be paid it is self evident that something must be done to increase the output of the individual.

Fortunately many of the American industries are of such a nature that specialization is possible in this country; for instance, the agricultural interests require the use of extensive machinery for harvesting the crops. In other lines of manufacture, machinery had to be used to an extent never heard of before. Special examples of this are found in the boot and shoe business and in the textile business. One of the finest foundries in the United States is maintained by the United Shoe Machinery Company, Beverly, Mass. In like manner there are a half dozen very large textile machinery manufacturers catering to the cotton machine trade. Other lines have developed in a similar way, and this has made possible the specialization of the design of machinery which in turn has made possible larger orders of duplicate work in the foundry. Orders of from 100,000 to 1,000,000 castings from one pattern are not uncommon in the United States.

For making a larger output of castings a variety of molding machines has been developed, and the American molding machine, unlike the French, is intended in most cases to perform a limited number of operations with very great speed, in place of performing several operations with extreme accuracy. It is true that in much of the American molding machine work great accuracy is also secured, but even then considerable of the work is done by hand.

Effect of Machinery on the Core Room

American foundries, however, have gone into the use of handling machinery much more extensively than those abroad, and all of this work has influenced the core room. Until recently the cores were mostly made in boxes by hand, the increase in output being obtained by using metal dryers for supporting the cores, by using very high grade boxes, and by using special core mixtures which were suitable for rapid work in all departments. The oil sand core has been developed in America to an extent that is probably unknown in any other country, and there are hundreds of foundries in the United States using upwards of $100 worth of oil per week, and there are some that use over $100 worth per day.

Until a few years ago all of the work in this field was the result of individual experimentation on the part of manufacturers. Most if not all of the core binders in use originated from experiments carried on in foundries. The core ovens, or, as they are called in England, core stoves, used in this country have for the most part been rather crude affairs in that up to recently they were of the natural draft type.

Comparatively little has been done in most foundries to control the temperature in core ovens, and few foundries have installed pyrometers or thermometers on such ovens. About 15 years ago, when getting up the shop and foundry practice course for the International Correspondence Schools, the writer commenced an investigation into the underlying principles of core room practice. Later, with the collaboration of George H. Wadsworth, the inventor of a number of core machines, this work was continued, principally at the plant of the Falls Rivet & Machine Company, Cuyahoga Falls, Ohio. Considerable success was achieved early in the work, but in the attempt to transfer it to other plants unexpected failures were encountered. This indicated plainly that we lacked a knowledge of the underlying principles and particularly of the reactions which took place between the different binders, and between the sand and the binder.

Green and Dry Binders

In this country we distinguish between the green binder and the dry binder. By green binder we mean the binder which holds the green sand in place before it is baked. Unfortunately there is considerable confusion in foundry nomenclature, in that the term "green sand" is used in a number of different ways. For instance, all molds which are made from a molding sand carrying some clay which is formed without subsequent drying are called green sand molds. In like manner cores made from a similar molding sand mixture are called green sand cores. Such cores are frequently used where the castings are relatively thin, for instance, in the soil pipe trade.

In the aluminum casting industry in this country the expression of "green halving a core" means that the lower half of the core is made from the ordinary core mixture and baked, and the upper half is then to be formed from ordinary molding sand, such as is used for a green sand mold, and placed in the mold without baking. In some other industries the expression to "green half a core" means that one-half of it is made and baked, and then the other half is formed on top of this, of an ordinary core mixture, the whole returned to the core oven and baked again, and thus forming a complete dry sand core without the use of a dryer, or without the use of the bedding sand supporting the core while it is drying.

Binders in Common Use

To reduce the expense of cores many attempts have been made to find cheap binders. Those now in general use may be divided into the following classes: Oil binders made from the drying oils used in the paint trade, such as linseed oil, cottonseed oil, corn oil, soyabean oil, fish oil, whale oil, etc.; oils made from a combination of drying oils and gums dissolved in mineral oils, these gums generally being resin in some form; oils made wholly from gums dissolved in mineral oil. Such oils are generally more sticky than the others and give more or less trouble in the core boxes, but they are very cheap, and hence have found favor with many.

Binders having a pitch or gum base include resin which is ground and mixed with sand; also pitch derived from the purification of coal, tar or other products. The trouble with these last mentioned pitches is that the coke which forms when the metal is poured around the core is so hard that it renders the cleaning out of the core difficult. To overcome this the black core compounds used in the United States are mostly composed of pitch mixed with what is called sea coal. This is a ground bituminous coal usually made from a regular gas coal high in volatile products. Coke dust is also sometimes used, and in the better grades of binder, dextrin. Dextrin has the advantage of always acting as a green binder; that is, one which will hold the core in place before it is baked. This class of dry compounds, including both the black compounds and resin, bind the sand by the melting of the resin or pitch, and flowing between the sand particles.

There is another extensive series of binders which include the paste class. These are flour, either made from wheat or rye; starch, usually made from corn, or dextrin. This class of binders all have one objection, and that the cores made from them if exposed to dampness for some time will gather moisture and become soft; hence these cores have to be kept in a dry place until just before they are used, and they must not be left in green sand molds for a considerable time before the molds are poured. A few foundries in this country use for large cores

*Paper read before the French Foundrymen's Association, Paris, France, May 26, 1913.

considerable portion of clay with flour, which gives better moisture resisting properties.

Water Soluble Binders

There is another broad class of binders which can be called the water soluble binders. These include sour beer and distillery returns from the rum distillery; molasses, either from cane or beet sugar works, and the refined extract from the sulphite paper industry which is marketed in this country in a neutral condition under the name of glutrin. All of these binders possess some special advantages, but the first two are only used locally where there is a local supply, and are not as efficient as the last two mentioned. The principal objection to molasses is that molasses from various sources differs in strength, and that it is also subject to fermentation which greatly reduces its strength. Therefore for the general class of work the sulphite liquor product has been found the cheapest of the water soluble binders.

Core oils of the drying oil type have very little green binding power. This is also true of gums dissolved in crude oil or petroleum. The pitch and gum binders including resin have very little green binding power, but these are usually employed with sands containing more or less clay which serves as a green binder. The best results with oils are obtained with sands free from clay, such as sea sands, clean bank sands, or crushed and washed silica rock. These sands when mixed with oil have practically no binding power in the green state, and hence are only suitable for cores which do not have overhanging parts.

In the case of the pitch and gum binders the addition of dextrin to the binder serves to supply a green bond. Flour, starch and dextrin all act as green binders. Molasses and the other water soluble binders have very little green binding power when used with sharp sands. Most of these binders, however, are generally used with sands carrying more or less clay, and hence the clay furnishes the green bond.

One advantage of the sulphite liquor product known as glutrin is that this carries a certain amount of tannin bodies, and these tannin compounds react with the clay in such a way as to make the clay more efficient as a binding agent; this is true both of the green and dry cores.

The binders of the oil, gum and pitch class all tend to flow to the contact points of the sand, thus supplying a bond of maximum efficiency. Binders of the paste type—that is, flour, starch and dextrin—have little or no tendency to flow during the drying operation, and hence only the part of the binder that happens to be in contact with two sand grains is efficient, and any of it that may be distributed in the spaces between the sand grains is wasted so far as binding properties are concerned, and it is a positive detriment when the metal is poured on account of the fact that it serves to create an excess of gas.

All of the water soluble binders tend to flow toward the contact points of the sand as the drying of the core proceeds. Some of them even tend to sweat to the outer surface of the core so as to form a shell leaving a soft interior. Most of the water soluble binders will work well with flour, starch or dextrin, but will not work so well with oil. Molasses at the moment of hardening bubbles up, and this action tends to break any oil films which are forming. The sulphite liquor product, glutrin, dries down to a hard mass at the contact point, and thus acts like oil, pitch or resin, and hence it will work efficiently with any of these binders.

Interrelation of Binders

One point which the foundrymen have neglected in the past is that certain binders interfere with each other while other binders support one another. For instance, if oil is used in company with either flour, starch or dextrin, the latter binders will tend to absorb the oil, which has two effects: first, the oil-soaked paste has less binding properties than a water-soaked paste, so that the efficiency of the paste is reduced; second, the absorption of the oil by the paste prevents the flowing of the oil to the contact points of the sand grains and so reduces its efficiency in this respect. Clay also absorbs oil and reduces its efficiency, and the oil in turn reduces the efficiency of the clay as a binder. There are also certain ingredients frequently found in local sands which will interfere with binders, as, for instance, a sand containing an excess of alkali will tend to saponify an oil, and thus destroy its binding power. The writer has even observed cases in which the water used for mixing core sand and core compounds had a marked effect on the efficiency of the compound. This is particularly true when the water is highly alkali.

The specialty shops of the United States have settled upon certain compounds and methods to be followed in different trades. The oil sand core has become almost universally employed in the making of cores for pipe fittings up to 4-in. in diameter. In like manner the oil sand core is almost universally used for automobile jackets, and, in fact, for all of the work in connection with automobile cylinders. For larger cores which are used in large gas engines, stationary engines and general machinery the black core compounds with the pitch base are very largely used. In aluminum castings resin cores are very extensively used on account of the fact that the moment the metal is poured the resin softens and allows the metal to contra- on the core, thus avoiding cracks.

Use of Strong Cores Preferred

The general tendency in the United States is to use an excessively strong core on account of the fact that it receives more or less rough handling in the foundry. In the making of hot water and steam radiators the cores for the loops are usually made from oil sand without any rods or wires in the cores. This is one of the most difficult core jobs in the United States. The cores for hot water boilers and other similar relatively chunky work having a thin metal wall are largely made from flour on account of the fact that a flour core under these circumstances burns out and releases from the casting more easily than most other types of core.

A typical clay core which is released by sawdust is used in some cases, particularly for heavy work. In this case a considerable amount of sawdust is mixed with the core mixture, and this sawdust burns when the metal is poured around the core, and thus releases the sand. The use of sawdust is the exception rather than the rule in this country.

Cores for Accurate Work

For very accurate work the core mixture must be such that it neither shrinks nor swells during drying, and this is best effected with a high percentage of silica sand bound with oil. For accurate work the cores should be baked in metal dryers which will support them perfectly during the drying operation.

There is one class of cores in which we encounter exceptions to two of the general rules. These are cores formed on a core machine by forcing the material through a die. In the first place, for the preservation of the die and the free working of the machine it is necessary to have some oil in such a mixture. In the second place, in order to make the core stand up or support itself when in the green state it is necessary to use a binder of the paste type, such as flour or a combination of flour and clay. As the oil in such a core will interfere with the flour or clay it is necessary to use an excessive amount of binder in cores of this type, but the fact that the machine forms the core so cheaply and accurately more than offsets the extra cost of binding material.

Using Over Old Sand

The most progressive concerns are beginning to find that it pays best to use a sand which can be cleaned and used over. To accomplish this the physical property of the sand must be such that it is not badly shattered when the metal is poured about it. For work of this kind the individual sand grains must be rounded and contain as few cracks or flaws as possible. An examination of a core sand with a microscope or magnifying glass will tell much as to its probable fitness for repeated use. One radiator concern in the United States is using about 80 per cent. old sand in its radiator cores, the material as it comes from the castings being cleaned by washing.

In the case of oil sand cores the percentage of oil required depends to a large extent upon the relative sizes of the sand grains. With uniform sized sand grains the smallest amount of oil will be necessary. Also the grains should be as large as is consistent with the work being made. When the sand contains a variation of sizes of grains you will have many contact points which are of no value in imparting strength to the core, for it will take just as much oil to bind a small particle of dust to a grain

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of sand as it does to bind two grains together. For this reason, when the sand is to be used over the dust should be cleaned out either by washing or dry cleaning.

Baking of Cores

There is a very close relationship between the baking time necessary for a given core mix and the density of the core mix. For instance, experiments have shown that the time necessary for baking a given class of cores could be reduced by one-half by using a more open mixture and a smaller amount of a very high grade core oil. Core oils containing mineral oils always retard the baking time on account of the fact that the mineral oil or petroleum products have to be volatilized and driven out before the gums, pitches or asphaltums can act as binders.

In the case of a regular drying oil, such as linseed oil, as quick as the accompanying moisture is driven out the oil is then subjected to oxidation and hardens in this manner. The difference between the hardening of the binders in the case of the drying oils and the hardening of the binders in the case of other oils is that with the drying oils it is essentially an oxidizing process, while with the gums it does not involve the supply of oxygen to the oil. Experiments have shown that the linseed oil film when dried down properly weighs more than the original oil. It is for this reason that the expensive drying oils have been found so advantageous for high grade cores, and particularly for the fast drying of this class of cores.

All of the oil sand cores of the drying oil type can be dried at 400 deg. F. or slightly higher. In case of resin cores it is best to only heat them high enough to dry out the moisture and melt the resin. A temperature in excess of this tends to break down the resin and reduce its binding power.

Flour, starch or dextrin cores should all be well baked below 400 deg. F., and the best results are obtained between 250 deg. and 300 deg. Where the question of speed of drying enters it is sometimes cheaper to use an excess of binder and put up with some burning and damaging of the binder by the excessive heat. The water soluble binders can all be dried at any temperature up to about 400 deg.

With ordinary core ovens it has been found impossible to control the temperatures in different parts of the oven with any degree of accuracy, and this has been the cause of much irregularity in core mixtures. The average foundryman uses from two to three times as much core binder as is required for his work simply to make sure that the cores in the hottest part of the oven have not been burned so badly that they will not possess sufficient strength to enable him to use them.

Core Making Machines

In the United States there are several distinct types of core making machines now in use. The type most extensively used follows very closely the leading type of American molding machine, in that it is only a device to do away with a few of the more delicate manual operations in the making of a core. The most common type used in automobile work is a plain roll-over machine to which is attached a core box. The core box is filled with sand, the necessary core wires or rods being adjusted as the box is filled. The core plate is then clamped in place, the box rolled over and drawn off from the core by means of the machine. This leaves the finished core on the core plate. The advantages of this machine are simply that they do away with the necessity of skill in the drawing of the box from the core, and that in the case of heavy cores the roll-over device reduces the manual labor.

Machines of the second class are slightly more elaborate, in that they have some form of vibrating or jarring attachment to assist in packing the sand in the core box. These machines are also provided with attachments for rolling over the core box and drawing it off from the core.

For plain stock cores, such as round cylinders, a type of machine which forces the sand through a die by means of a plunger or screw is in very common use, but the work which can be performed on these machines is limited.

Within the last few years there has been developed another type of machine which forces the sand into the box with compressed air. In this machine a given mass of sand is enclosed in a box or compartment in the machine where it is subjected to a very high air pressure. One or more small openings are provided between the core box and this chamber, and when the valves in these small passages are opened the compressed air between the sand grains in the chamber begins to expand, and this causes the sand mixture to flow into the core box and fill it completely. Machines of this type are only suitable for use where a very large number of cores are to be made which are duplicates, on account of the fact that the mixture employed can have no green binding properties, and half of the core box must serve as a dryer. This necessitates the making of a very large amount of carefully designed rigging, but where the orders run into hundreds of thousands or more a machine of this kind is suitable.

Handling Appliances in the Core Room

The greatest savings that have thus far been effected have been in so planning the core room work that each man has certain definite duties to perform and that he does not have to leave his regular work space while carrying on these duties. To accomplish this, devices have been installed for delivering the sand to the core makers; for conveying finished cores from the core makers to the baking ovens, and then for conveying the baked cores to the storage, and later handling them to the foundry. The laying out of any system of this kind is a matter involving very careful study. A number of automatic devices have been installed which, while they made the core room one gigantic machine, they at the same time limited the possible output of every operator in the room.

Any successful system of managing a manufacturing department must be so arranged that the several units of which the system is composed can each be operated to its maximum output and maximum efficiency. This involves a careful study of the manufacturing problem and the proper arrangement of the separate units. A few general principles may be stated which it is well to bear in mind when attacking any problem of this kind:

First, in handling either core sand or molding sand which is tempered with water the material should not be exposed to the air in a thin stream, but should, where possible, be handled in bulk in buckets, boxes or other suitable retainers. This is to avoid excessive evaporation, and also to avoid the segregation of the sand into balls, as is the case when tempered sand is handled on belt conveyors.

Second, all of the supplies or appliances necessary for an operator should be delivered to that operator. In the case of core making this includes core sand, rods, or wires that are necessary, core plates and other miscellaneous supplies. Also it should be arranged that the cores are taken away without the operator leaving his bench.

Third, mechanical carriers which move at a fixed speed are not advantageous for removing work from operators, on account of the fact that those that are farthest from the ovens always have plenty of room on the carrier, while those who are near the ovens frequently cannot find a place to put their cores. To overcome this difficulty carriers consisting of a series of ball bearing rollers have been introduced into a good many plants, and the operators themselves push their work along on these rollers. In this way any operator can open up the line of cores and find place for his work.

Fourth, finished cores after baking should be put into suitable carrying boxes, and in these boxes should pass through the core storage into the foundry without rehandling of the individual cores. This is particularly true in the case of small work.

Fifth, a system of core room accounts should be arranged which will show the loss due to breakage and burning of cores or other causes, and should fix the blame upon the proper parties, and thus point to the method of eliminating such loss.

In the latter part of May the molders, coremakers and patternmakers employed at the Pittsburg, Cal., plant of the Columbia Steel Company went out on a strike, demanding recognition of the union. The company has been replacing the strikers and notwithstanding the fact that none of the latter came back to work for the company the steel foundry at Pittsburg made its maximum output in July. The Pittsburg plant and that of the same company at Portland, Ore., have always been operated as open shops.

Ammonium Sulphate from Coke Oven Gas

European Processes Which Dispense with the Use of Sulphuric Acid

It is well known that to obtain ammonium sulphate from the ammonia in coke oven gas sulphuric acid has to be used. For each ton of sulphate about one ton of 60° Beaume acid is needed, so that the outlay of the by-product coke oven plant for acid is considerable. For this reason efforts have been made to utilize the sulphur existing in the gas as sulphuretted hydrogen as the source of the acid, and in this connection a recent article by J. Reichel in Stahl und Eisen is of great interest. He gives in detail the wet processes of Burkheiser and Walter Feld, together with the practical results so far obtained.

The Burkheiser dry process has already attracted some attention, and has been installed at a plant in Belgium and one in England. The operating difficulties that developed were so great that at both plants the wet process is being put in. The active Burkheiser reagent is bog iron ore that is roasted and freed from all organic matter and part of the combined water. The coke oven gas from the ovens is freed from tar with as little cooling as possible. The ammonia liquor which is produced is boiled in the usual way with cream of lime and the ammonia vapor added to the cleaned gas so that the latter is given all the ammonia, sulphuretted hydrogen and cyanogen compounds of the original gas.

This gas then passes through a rotating cleaner divided into separate compartments where it is thoroughly mixed with the cleaning fluid consisting of the finely divided Burkheiser reagent suspended in water. The sulphuretted hydrogen forms iron-sulphur compounds, and soluble alkali-polysulphides and sulphocyanides are also produced. The washing liquid is removed, the solid sulphides filtered off, dried and roasted, giving a mixture of SO_2 and SO_3 and fresh reagent which is added to the filtrate and is ready for another cycle. From time to time a part of the liquor is taken and separately treated, the sulphocyanides being completely decomposed and ammonia produced. In some cases the total ammonia output is increased 10 per cent. The gas from the rotating cleaner contains only ammonia. It passes through a saturator and a tower and emerges as thoroughly cleaned gas. The washing liquor is a solution of acid and normal ammonium sulphite. The acid sulphite absorbs the ammonia giving normal sulphite. This same liquor goes to another tower through which the SO_2 and SO_3 gases pass. The normal sulphite is changed to acid sulphite, and is then ready to absorb more ammonia. As the solution gets stronger normal sulphite crystallizes out in the saturator. It is removed, centrifuged, and collected, its place being taken by more water. The salt obtained is a varying mixture of ammonium sulphite and sulphate, the latter being produced by the SO_3 in the gases, and by oxidation from the air. It is high in ammonia and of good white color. Examination of a sample sold by Burkheiser & Co. showed 99 per cent. sulphate and 1 per cent. sulphite. Analysis gave:

	Per cent.
Ammonia	25.66
Free acid	not present
Insoluble	0.13
Moisture	0.045

It is weakly alkaline, suffers very little loss in ammonia by standing, and in 6 days the total loss in weight was only 0.0037 per cent. The advantages of the process are that with a high sulphur coal no acid has to be bought; the cyanogen compounds are changed to ammonia; the gas is clean and ready for lighting, heating, or raising power; no harmful sulphurous acid will be formed as the gas is free from sulphur; and the apparatus will have a long life because no acid is used.

The Walter Feld polythionate process depends chiefly on ammonium compounds of tetrathionic and thiosulphuric acid, but the chemical reactions are not altogether known. The gas from the ovens is freed from tar as before, and the ammonia in the condensed liquor driven off and added to the main volume of gas, which is washed in a tower with either ammonia water or plain water. The water absorbs ammonia and sulphuretted hydrogen from the gas. It is treated with sulphurous acid in another tower and polythionate formed. This solution is then used as the washing liquid in a tower receiving the partly cleaned gas containing ammonia, when thiosulphate is formed and sulphur precipitated. When again treated with sulphurous acid, polythionate is formed. This cycle is repeated until the solution contains 38 to 40 per cent. of the salt, when a part is drawn off and replaced by ordinary or ammonia water. This part is treated with sulphurous acid for 5 to 10 hr.; then heated with a steam coil for about 6 hr., by which ammonium sulphate is formed and sulphur precipitated. This sulphur is filtered off, washed, dried and burned in a special kiln to furnish the sulphurous acid for the process. The ammonium sulphate solution is taken to a vacuum evaporator supplied with steam coils, the crystallized salt is removed, centrifuged, dried, ground, and placed in sacks for shipment. It is red in color due to the presence of sulphocyanides of iron. A sample gave the following analysis:

	Per cent.
Ammonia	25.33
Free acid	none
Insoluble	0.97
Moisture	0.13
Oxide of iron	0.46
Sulphur as sulphide	0.12

With a high sulphur coal up to 80 per cent. of the sulphuric acid formerly used can be dispensed with, and the cleaned coke oven gas will give much less trouble due to sulphurous acid, because of its lowered sulphur contents.

G. B. W.

Steel Passenger Cars Displacing Wooden

According to the American Railway Association, the construction of wooden passenger equipment has practically ceased and rapid strides are being made toward fully equipping railroads with either steel or steel underframe cars.

Reports from 247 railroads, operating 227,000 miles in the United States, disclose that between January 1 and July 1, 1913, orders were placed for 1140 passenger equipment vehicles, including sleeping, dining, postal, baggage, express cars, etc. Specifications for 1064, or 93.3 per cent., were for all steel cars and the remainder will have steel underframes.

Of 1880 passenger equipment vehicles acquired in 1909 by lines represented, 26 per cent. were built of steel, 22.6 per cent. had steel underframes and 51.4 per cent. were of wood. In 1912 the roads purchased 2660 cars for passenger service, and of the total only 10.4 per cent. was of wood.

A feature of the report is that on January 1, 1913, there were 1649 passenger cars under construction, of which 85.2 per cent. were to be all-steel construction and only 3.3 per cent. of wood, indicating the practical cessation of the manufacture of the latter. The following table is of interest showing steel passenger cars approximately in service up to January 1, 1913:

	Steel.	Steel underframe.
January 1, 1909	629	673
January 1, 1910	1,117	1,098
January 1, 1911	3,133	1,636
January 1, 1912	5,347	2,399
January 1, 1913	7,271	3,296
Increase 1913 over 1909	6,642	2,623
Increase 1913 over 1909	1,055%	389%

Missouri Lead Miners' Strike

Following a refusal of the demands of the lead miners in the southeastern Missouri district for an increase in pay of 50c. per day and full recognition of the union, a strike was declared effective Saturday morning, August 16. The mining companies offered a compromise of 15c. additional per day and later of 25c. per day, but without recognition of the union, which is affiliated with the Western Federation of Miners, and this was ignored. Some of the companies have begun to remove their mules and other equipment from the shafts preparing for a long fight. The State Board of Arbitration has requested the miners to keep the pumps going to prevent the mines from filling and being practically destroyed. The district is the largest lead producing district in the world. Interests involving about $60,000,000 are affected by the strike, including, in addition to the mining properties, smelters at Herculaneum, Mo.; Collinsville, Ill.; Federal, Ill., and some minor points. The miners number about 6000 and about 20,000 persons in six or eight towns are dependent upon the lead mines for a living, directly and indirectly.

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Steel Imports Under the New Tariff

The impending tariff act has had little traceable influence thus far upon domestic prices of iron and steel products. Doubtless it is one reason for the increasing prevalence of the policy of buying for short periods ahead, particularly on the Atlantic and Pacific coasts, and to that extent it tends to deprive prices of the sustaining effect of heavy contract buying. But, speaking generally, American steel manufacturers have indulged in no alarmist predictions. One reason is that they have not believed their competitors abroad would invite a retaliatory invasion of European and neutral markets by dumping iron and steel products here. It is quite probable also that they have felt equal to meeting any competition from Europe that involved a legitimate profit for the foreign product. They have also been so busy meeting the demands of insistent consumers at home that they have been disposed to postpone crossing the tariff bridge until they reached it.

European steel manufacturers, after three years of excellent business, have encountered of late signs of slackening activity. That condition will make them more desirous of placing some of their product here, at the same time that it will make them hesitate to give American exporters of steel occasion for unusual aggressiveness in foreign markets. How far the exchange of courtesies between representative steel manufacturers of Great Britain, Germany, France, Belgium, Austria and the United States in 1910 and 1911 and the friendly relations growing out of the New York and Brussels meetings will count in preventing disastrous competition is scarcely a profitable subject for speculation. No doubt the more intimate contacts of recent years have fostered mutual respect, as the ability of the leading companies in one country to meet the fighting costs of those in another has been disclosed. And on certain products the manufacturers in Great Britain and in Germany, France and Belgium already have understandings, the spirit of which is quite opposed to the entrance of these producers, singly or collectively, upon a campaign of aggressiveness in the American market.

It may be argued that the agreeable personal relations between the heads of the leading steel companies in this country did not prevent the decline of domestic prices late in 1911 to the lowest level in more than a dozen years. But the competition of 1911 was in the natural market of all who engaged in it. For European steel makers to advance upon the American market with a view to acquiring and holding a portion of the trade here is an undertaking involving very different considerations. In some finished products the customs of the trade as embodied in current specifications as to quality, sizes and other details will work against any considerable importations, notably in rails, structural shapes and wrought pipe. Semi-finished steel—billets and sheet bars—will be the line of least resistance, next to pig iron, on the score of adaptation to the demands of the American buyer. In finished products bars will have few difficulties for the foreign maker, in respect to meeting trade requirements.

As we have pointed out in other discussions of import possibilities under tariff reductions, the more likely effects of removing or greatly reducing the duties on iron and steel products are the shipping in of enough foreign steel in times of special prosperity in the home industry to prevent prices from going beyond moderate

, and in districts remote from domestic steel , as on the Pacific coast, some increase, under ary conditions, in the consumption of foreign cts in certain lines. The opportunities for im- generally speaking, will chiefly come when a tide of prosperity here finds hungry mill capac- broad, or when, as at present, domestic mills are g slower inroads on accumulated orders than abroad. Just now, as our London cable of this says, foreign markets are being sounded with a to the bringing of steel billets to this country these become duty free. With the duty re- d billets could be laid down at Philadelphia at o $23, on the basis of the low prices made in by Continental sellers, as against $26.50 to $27 omestic billets. Steel bars, which went to $21.90 erp, per gross ton, in recent sales, could be sold delivery at Philadelphia, under the 6 per cent. erwood duty, at about 1.20c., as against a present of 1.55c. Philadelphia. It is thus evident that for e at least and on some products the effect of the ge of the Underwood bill on domestic iron and prices is by no means to be considered negligible.

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hort Corn Crop May Not Affect Business

he glowing expectations of a heavy corn crop, h were confidently entertained up to the early of July, have been sadly upset by the excessive and dry weather which have prevailed since then a large part of the great corn belt. It was y believed that the bumper crop of 1912, when than 3,000,000,000 bushels was garnered, would qualed this year, but the prospects up to a month were strongly in favor of a return not much below enormous yield. It is now estimated that the crop not run over 2,400,000,000 bushels, while some ates, probably made to influence speculation in run as low as 2,000,000,000 bushels. Even if ,000,000 bushels should be realized, this will be avy falling off from the figures of last year and reduce considerably the supply of farm produce d upon for both human food and the feeding of stock. The reports from some sections of the West been highly sensational the past week, indicating conditions in those localities have been of almost strous proportions.

While the partial failure of this important crop undoubtedly be severely felt by the people of the ons immediately interested, the result to the on at large may not be nearly so serious as set h in pessimistic utterances in some financial quar- We have had previous experiences as to crop res of this character, and they have not been fol- d by business depression or anything approaching In 1901 we had a condition of affairs strikingly ar to that experienced this year. A long visitation ot dry weather caused a shrinkage in the corn from 2,105,000,000 bushels in the previous year ,522,000,000 bushels. This was regarded with con- rable trepidation at the time, and great appre- ion then existed as to the effect on business. ously enough, it caused scarcely a ripple. Accord- to the figures of the Department of Agriculture, value realized from the short corn crop of 1901 was $921,000,000, as compared with $751,000,000 on very large crop of the previous year. While the n-carrying railroads secured less tonnage from corn, the farmers who were fortunate enough to raise part of a crop got more money.

Examining the railroad reports for that period, it is found that in the fiscal year ended June 30, 1902, which covers the crop year 1901, the operating revenues of the railroads of the United States were $1,726,000,000 against $1,588,000,000 the previous year, while the amount available for dividends and improvements at the close of the fiscal year 1902 was $330,193,000 against $282,019,000 the previous year. Thus the railroads appear to have felt no ill effect whatever from the short corn crop of 1901. It may be remarked in passing that the wheat crop of 1901 was one of the largest harvested in this country up to that time, just as the wheat crop of this year has proved to be a record breaker.

Turning to the iron trade of 1901 and 1902, it is found that the reports for those years were exceedingly satisfactory. The reviews of the year 1901 refer only casually to the failure of the corn crop, paying much more attention to favorable developments. Our Pittsburgh review published January 2, 1902, stated that 1901 was one of the best years the iron trade had ever known. The Chicago review said: "The Chicago iron trade was undoubtedly more active in 1901, and the quantity of iron and steel consumed in the district tributary to Chicago was much larger than in any previous year."

It will be remembered that 1901 was noteworthy for the great Northern Pacific stock panic, which occurred May 9, and for the serious strike which took place in many of the works belonging to the United States Steel Corporation. It was a remarkable year in the development of both favorable and unfavorable conditions. It might have been expected, however, that even if the effect of the short corn crop had not been felt in 1901 it would have some influence on business in 1902. That year, however, also proved to be a good year. The operating revenues of the railroads for the fiscal year ended June 30, 1903, rose to $1,900,000,000 and the amount available for dividends and improvements increased to $357,033,000. Further, the demand for iron and steel in 1902 was so heavy that it was necessary to import enormous quantities. In the twelvemonth ended December 31, 1902, this country imported 1,212,839 gross tons of iron and steel against an importation of only 221,292 tons in 1901.

In the light of our experience after the short crop of 1901, it would appear an easy matter to overestimate the possible effect of the heavily reduced corn crop of this year. Other conditions affecting general business are likely to be more potential. If we could but have an early settlement of the tariff question, currency legislation of a sane and sensible character, the complete adjustment of European conditions on a fairly permanent peace basis and the restoration of normal relations with Mexico, this country could reasonably expect another period of decided prosperity. Our agriculturists have been placed in such an independent position by several years of abundant crops, which have been disposed of at high prices, that such an incident as a short corn crop would be of merely local effect. Apparently, it would require the failure of an important crop for two or more successive years, or the concurrent failure of several leading crops, to affect general business. This year, fortunately, the only serious shortage is in the corn crop.

Correspondence

Accumulations in Steel of Scrap Impurities

To the Editor: In *The Iron Age* of February 23, 1911, appeared an article by me, entitled "Building up Impurities in Steel." My attention has just been called by John Howe Hall to a serious error in one of the deductions which I drew, this in turn leading to an error in a formula derived from the basic formula.

The original formula considered only the condensing or "building up" of an element which, like copper, is not added to by the melting stock in the cupola. From this formula came the step to the consideration of the case of elements which, like phosphorus and sulphur, are increased in quantity by absorption from the fuel in melting. The original formula was as follows:

$$x = \frac{(100 - a)c + ax}{100 - b}$$

resolved to:

$$x = \frac{(100 - a)c}{100 - (a + b)} \text{ or } \frac{100c - ac}{100 - (a + b)}$$

where:

a = the percentage of steel scrap in the cupola charges

$100 - a$ = the percentage of pig iron in the cupola charges

b = the percentage of loss in both melting and converting

c = the percentage of the element in question in pig iron used.

x = the maximum percentage of the element in the steel after an indefinite number of operations.

In the case of an element like phosphorus or sulphur, another factor must now be considered:

d = the percentage of the element taken up by the metal in one melting operation,

and this makes the original formula read:

$$x = \frac{(100 - a)(c + d) + a(x + d)}{100 - b}$$

and by resolving

$$x = \frac{(100 - a)c + 100d}{100 - (a + b)} \text{ or } \frac{100(c + d) - ac}{100 - (a + b)}$$

which is identical with the original formula except for the addition of $100d$.

In the original article in *The Iron Age*, I then stated that "it is apparent that all we need to do is to add in the first place the amount 'picked up' in a single melt to the percentage in the pig iron itself and use this as the constant c in the original formula." This is an error. I should have said that the sum of the percentage of the element in the pig iron and that "picked up" in melting should be used in place of the constant c in the first term of the numerator of the second resolved formula.

The illustration given for the calculation of the maximum phosphorus content assumed a melting loss of 15 per cent. a steel scrap burden of 40 per cent. of the charge, a pig iron containing 0.05 per cent. phosphorus, and an addition by the fuel of 0.01 per cent. of phosphorus in each melting operation.

Then

$$\begin{aligned} a &= 40 \\ 100 - a &= 60 \\ b &= 15 \\ c &= 0.05 \\ d &= 0.01 \end{aligned}$$

and the formula should give

$$x = \frac{(100 \times 0.06) - (40 \times 0.05)}{100 - (40 + 15)} = 0.08888 +$$

which is the maximum percentage of phosphorus that can be accumulated in the steel under the conditions assumed, and not 0.08 as in the original article in *The Iron Age*.

Carrying through the calculation of a few blows (under the conditions assumed above) by "long hand," we obtain $\frac{0.06}{85} = 0.07058824$, the percentage of phosphorus in the steel from the first blow.

$$\begin{aligned} 0.60 \times 0.06 &= 0.036 \\ 0.40 \times (0.07058824 + 0.01) &= 0.0322354 \\ &\overline{\quad\quad} \\ &0.0682354 \end{aligned}$$

and this sum divided by 0.85 is equal to 0.0802769, the percentage of phosphorus in the second blow.

Similarly we find 0.084843 per cent. of phosphorus in the steel after the third blow, 0.086085 per cent. after the fourth blow, 0.087993 per cent. after the fifth blow, 0.08 per cent. after the sixth blow, and so on to 0.08889 cent. after the eleventh blow, which is measurably close to the maximum limit as found by the formula.

In my original article I failed to make allowance the deduced formula for the very evident fact that same amount of phosphorus (or sulphur of course) wo be added by the melting in the cupola to the steel sc in the charge as to the pig iron. This omission was fa to the usefulness of this derived formula, and I trust you may find place in your columns for this correcti

A. H. JAMESON.

BRANFORD, CONN., August 12, 1913.

NOTE: In introducing the article to which Mr. James refers, he emphasized how in steel plants, and particula in steel foundries where the side blow converter is us one hears a good deal about the accumulation in the st of certain of the injurious elements, through the ret of the steel scrap to the furnaces. He mentioned a the uncertainty as to the extent or limit of this "build up," as it is called, so that some fear to use any scrap e cept that lowest in the content of these impurities. T sometimes sell their own scrap or send it to a basic furn and buying what scrap they need for their own uses. Th too, he went on to say, some refuse to use cupriferous p iron at all, fearing that an excessive amount of cop will accumulate in the steel, while many insist on a p iron much lower in phosphorus than is necessary, for fe of this same "building up" in the steel. His article th sought to show algebraically what the maximum limit the impurities really may be, and this part, in its revis form, is reproduced in the foregoing, substantially as —EDITOR.

Tariff Revision Drags in the Senate

WASHINGTON, D. C., August 19, 1913.—The Unde wood-Simmons tariff bill has now been pending bef Congress longer than any previous tariff revision meas with the exception of the Wilson-Gorman bill, and t indications are that it will beat the record of the la named measure so far as time pending is concerne Four months and twelve days have elapsed since the U derwood-Simmons bill was introduced in the House. Th Payne-Aldrich bill was signed by the President fo months and eighteen days after being introduced, and th Dingley bill four months and six days. The Wilso Gorman bill was eight months and nine days in reachi the president. It was introduced December 19, 18 passed the House February 1, 1894, and passed the Sena July 5. Five weeks were consumed in conference betwe the two houses. Chairman Underwood introduced th pending bill in the House April 7, and an amended bi April 21. It passed the House May 8, was received by th Senate next day, and referred to the Finance Committe It was reported to the Senatorial caucus July 7 and the Senate July 11.

The most important schedules of the bill are yet to b considered. Senator Cummins's substitute for the met schedule, which provides for rates generally lower tha the present tariff act, but materially higher than the pen ing bill, has yet to be voted on, and before it is Senat Cummins intends to address the Senate at length upon The sugar, woolen, cotton, silk, and other schedules r mained undisposed of. Senator LaFollette will probab occupy about a week in presenting his substitutes fo various schedules.

President Wilson's insistence that there should be cu rency legislation at the present session completely upse the plans of the Senate majority leaders with regard t the tariff bill. The opposition Senators, admitting that was undoubtedly the intention of the majority to jam th bill through without permitting amendments, agreed t vote at an early date on the bill if an agreement could reached that a recess would be taken when the Presiden approved the measure, the recess to last until either No vember 1 or 15. The majority leaders were about to ac cept this proposition and thus relieve to some extent th uncertainty in manufacturing circles brought about by th delay, but President Wilson sent for majority Senator and urged upon them the importance of disposing of th currency bill at the present session. A caucus was he

nd this caucus decided in favor of taking up the cur-ency legislation at the present session. The President kewise used his influence with the House leaders and ey will put the currency bill through by his orders at e earliest practicable date and send it to the Senate.

Efforts have been made by the Senate majority leaders show the President that the situation in the Senate is decidedly delicate one. Senator Johnston, of Alabama, ecently died and this reduced the Democratic majority in e Senate to one vote. As now counted, there are 48 emocrats who will vote for the bill, and 45 Republicans nd 2 Democrats who are opposing it. Senator New-nds, Democrat, is known to be dissatisfied with the easure, and the majority leaders are very much dis-rbed at a report which reaches here that the Nevada enator has heard from his State and will not support e bill unless certain concessions are made in connection ith products of Nevada. Senator Newlands is not now Washington. Therefore, the situation in the Senate that, notwithstanding the repeated declarations of the ajority leaders that no amendments will be permitted, is yet possible for compromises to be forced. Two emocratic Senators, Ransdell and Thornton of Louisiana, ave formally declared on the floor of the Senate that ey will not vote for the bill, stating that if enacted into w it will ruin the sugar industry in Louisiana.

W. L. C.

The Lake Erie-Pittsburgh Ore Rate

WASHINGTON, D. C., August 19, 1913.—The whole uestion of the freight rate on iron ore from Lake Erie orts to the Pittsburgh district, the Wheeling district and thers will have to be fought over again before the Inter-tate Commerce Commission. In May last, the commission, s a result of a complaint brought by the Pittsburgh Steel ompany and others, handed down a decision directing e carriers to cease discriminating against the Pittsburgh istrict in favor of others, but fixed no rates. The car-iers obeyed the decision by reducing the rate to the Pitts-urgh district from 96 to 88c. a ton and increasing the ate to the Wheeling district to 88c., thereby putting them n a parity. The new adjustment went into effect on riday, August 15. Thereupon, Wade H. Ellis, represent-ng the Pittsburgh Steel Company and others in the Pitts-urgh district and also the Wheeling Steel & Iron Com-any, filed formal complaint, and the whole case will have o be gone over again this fall. The Youngstown case, in hich the rate on iron ore from Lake Erie is attacked, is till pending before the commission.

In the new readjustment of rates, the Johnstown and eaver districts are given a reduction of 8c. a ton, this ining them up with the Pittsburgh rate. The situation as been still further complicated by the Wheeling & Lake rie Railroad filing a rate of 70c. a ton on iron ore from ake Erie to Steubenville and Mingo in the Wheeling istrict.

The commission has declined to suspend, pending its nvestigation, the readjustment which went into effect Au-ust 15.

After reciting the order of the commission directing hat discrimination cease, the new complaint which has een filed sets forth that the following were the rates com-lained of:

District	Nearest lake port		Average distance	Rate per gross ton	Mills per ton per mile
Pittsburgh	Ashtabula	.....	135	$.96	7.1
Wheeling	Cleveland	.....	133	.60	4.5
Columbus	Cleveland	.....	138	.50	3.6
Zanesville	Cleveland	.....	147	.55	3.7
Jackson	Toledo	.....	217	.62½	2.8
Ashland-Ironton	Cleveland	.....	267	.90	3.3

The complaint states "that the tariffs filed by the de-endant carriers and the other carriers with whom they oin in the making of rates by which they have established r propose to establish rates of 88c. per gross ton to the ittsburgh district and 88c. to the Wheeling district, while aintaining rates of 50c. to the Columbus district, 55c. to he Zanesville district, 62½c. to the Jackson district and 0c., or 3.3 mills per ton per mile, to the Ashland-Ironton istrict, leave a discrimination against the Pittsburgh dis-rict and in favor of the other districts which compete ith the Pittsburgh district just as unlawful as was the discrimination existing before said tariffs were filed" and therefore it is charged "that the 88c. rate now proposed for the Pittsburgh district is excessive and unreasonable." The complaint then asks the commission to prescribe specific rates.

W. L. C.

Canadian Iron and Steel Production

A compilation just made from manufacturers' returns to the Bureau of Statistics of the American Iron and Steel Institute shows that the production of steel ingots and castings in Canada in 1912 was 853,031 gross tons, against 790,871 tons in 1911, an increase of 62,160 tons or 7.8 per cent. The output of Bessemer steel ingots and castings was 207,569 tons; of open hearth ingots and castings, 645,062 tons, and of all other kinds, 400 tons.

The production of finished rolled iron and steel in Canada in 1912 amounted to 861,224 tons, as compared with 781,924 tons in 1911, an increase of 79,300 tons or 10.1 per cent. The production of rails was 423,885 tons, against 360,547 in 1911; of structural shapes and wire rods 64,082 tons, against 76,617 tons; of plates, sheets, bars and other rolled products, 373,257 tons, against 344,760 tons.

In 1912 the rolling mills and steel works of Canada which operated cut nail or wire nail factories produced about 788,190 kegs of steel cut nails and steel wire nails, against 652,861 kegs in 1911. Nails made by factories not connected with rolling mills are not included.

The production of pig iron in Canada in the first six months of 1913, including ferrosilicon and ferrophosphorus, amounted to 545,981 gross tons. The output in the whole of 1912 was 912,878 tons. Of basic pig iron the output in the first half of 1913 was 292,625 tons and of Bessemer pig iron, 125,052 tons.

Customs Decisions

Coiled Wire Springs

The Board of United States General Appraisers has decided adversely to a claim by the Roye Needle Company, Chicago, for a rate of duty lower than that assessed on coiled springs made from wire. Duty was exacted at the rate of 1c. per lb. and 35 per cent. ad valorem under paragraph 135, as articles made from round steel wire. The protest asked for classification at lower rates under the provision in the same paragraph for wire.

Copper Strips

The board has overruled a protest by Edgar T. Ward & Sons, Boston, relating to the classification of copper material, imported in so-called sheets, relatively thin, about 1 ft. wide and 6 ft. long. Duty was assessed at 45 per cent. under paragraph 199, as "manufacturers of metal," whereas the protestants asked a rate of 2½c. per lb. under paragraph 176, which provides for copper sheets. The Government contended that the material in controversy was cut into strips, while the importers claimed that the merchandise was in sheets.

Coated Zinc Sheets

L. C. Hirsch & Co., New York, have been sustained in a contention relating to the classification of metal material in the form of sheets, the chief or only use of which is for the manufacture of cigarette cases, buttons, buckles and like articles. The sheets were of zinc plated with copper and silver, and exhibited a striped, checkered or plaid surface effect, which, according to the official record, was the result of oxidation or other chemical treatment of the metallic coating or plaiting. The merchandise was returned for duty at 45 per cent. under paragraph 199, as "articles composed of zinc, whether partly or wholly manufactured, not specially provided for." The importers urged that the goods were the coated or plated zinc sheets for which special provision is made at a duty of 1¾c. per lb. under paragraph 194. In reversing the collector's assessment, the board held that the material in controversy is for manufacturing articles, as distinct from articles of manufacture ready for use.

The Erie Forge Company, Erie, Pa., has increased its capital stock from $300,000 to $750,000. It is making extensive improvements and additions to its plant.

The Iron and Metal Markets

Some Price Concessions

The Situation in Plates and Shapes

Vessel Contracts Pending—Lower Prices on Sheets and Semi-Finished Steel

The appearance in several instances of the quotation of 1.40c., Pittsburgh, on both plates and structural steel has been a matter of active comment in the past week. Apart from their recent quotations on Government work, it appears that the largest producers have adhered thus far to 1.45c. Several mills in the Central West have sold plates at 1.40c., Pittsburgh, and on some Eastern business shapes have been quoted at 1.40c. As is well known, the leading producers have a large tonnage on their books at 1.45c. and that price is still the rule, while the 1.40c. price is the exception.

Of particular interest to the plate mills is the new inquiry that has come to shipyards, both on the Atlantic coast and the Great Lakes. Sugar interests are reported to be figuring on three vessels for Panama routes and there are plans for two vessels for Atlantic coastwise trade. Lake shipbuilders are now making estimates on three large boats for the ore trade.

An inquiry has come from a Canadian yard for plates and shapes for a large vessel, and in other lines the outlook is for larger business with Canada.

Structural orders include 3500 tons for the Minnesota Steel Company's merchant mill and additions to open hearth department, 4000 tons for the Pennsylvania Lines West and 2500 tons for the St. Paul station at Spokane. The two coal-handling plants in Panama, for which the contract has just been let, will call for 10,000 tons of steel.

The steel rail manufacturers look for the early appearance of inquiries for 1914, including that of the Pennsylvania Railroad. Among recent export orders were 7000 tons of open hearth rails for the Moganya railroad in Brazil and 5000 tons of Bessemer rails for Japan. The total of recent orders under 1000 tons taken by Chicago district mills has been considerable.

Competition in sheets has been keener and 2.20c. for No. 28 has been done on much of the business of the past week. Large contracts have just been closed with automobile and implement makers, some of these extending to July, 1914.

In the wire trade the improved demand recently reported antedates the announcement of lower prices which appeared last week, as the new $1.65 basis for wire nails and $1.45 for plain wire had been named by some sellers two weeks earlier.

In wrought pipe a large contract has been taken by a Youngstown mill for the T. W. Phillips Oil & Gas Company.

Semi-finished steel has developed decidedly easier conditions in the past ten days. On sheet bars sales this week by smaller interests indicate a decline of $2 a ton from the basis on which third quarter contracts were made some weeks ago. A sale of 3000 tons is reported at $25.50 delivered in the Central West, netting the mill something less than $25.

The largest late sales of pig iron appear to have been made to pipe foundries and to basic steel works. One Southern producer sold 15,000 tons of basic iron at $11, Birmingham, and 6,000 tons of pipe iron on the basis of $11 for No. 2 foundry. In Virginia sales of 15,000 to 20,000 tons of pipe iron are reported and the leading furnace interest there has advanced its prices 25 cents or to $13.25 for 2.25 to 2.75 per cent. silicon iron.

Foundry iron has been less active in leading Northern markets. A few large buyers have declined to pay the advances asked, but furnaces have found less resistance on the part of smaller melters. Buying has been conservative and much is yet to be done for the fourth quarter.

In ferromanganese the expectation of an increase in domestic production has added to the recent pressure upon prices, and small sales have been made at $55, Baltimore, or $1 below the figure last announced by British makers. It has been considered in the trade that increased production in this country was contingent on the imposition of the proposed 15 per cent. duty.

Reports from foreign markets are more cheerful. In the recent flurry in sheet bars, when French and Belgian mills cut deep to get desirable Welsh business, nearly 200,000 tons went to Continental mills.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

	At date, one week, one month, and one year previous.			
	Aug. 20, 1913.	Aug. 13, 1913.	July 23, 1913.	Aug. 21, 1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia.	**$15.65**	$15.50	$15.50	$16.00
Foundry No. 2, Valley furnace.	14.00	14.00	13.75	14.00
Foundry No. 2 S'th'n, Cin'ti...	14.00	14.00	13.75	15.00
Foundry No. 2, Birmingham, Ala.	10.75	10.75	10.50	11.75
Foundry No. 2, furnace, Chicago*	15.00	15.00	14.75	15.50
Basic, delivered, eastern Pa....	15.25	15.25	15.00	16.00
Basic, Valley furnace.....	14.00	14.00	14.35	14.00
Bessemer, Pittsburgh	**16.65**	16.40	16.65	15.40
Malleable Bessemer, Chicago*..	15.00	15.00	14.75	15.50
Gray forge, Pittsburgh.....	14.25	14.25	14.40	14.40
Lake Superior charcoal, Chicago	**15.00**	14.50	15.75	16.25
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh ...	*25.00*	27.00	26.50	22.50
Open-hearth billets, Pittsburgh.	*25.00*	27.00	26.50	23.00
Open-hearth sheet bars, Pgh....	*25.50*	27.50	27.50	23.00
Forging billets, Pittsburgh.....	*32.00*	34.00	34.00	29.00
Open-hearth billets, Philadelphia	28.00	28.00	28.00	25.40
Wire rods, Pittsburgh	28.00	28.00	28.00	26.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	14.00	14.00	14.00	16.00
Iron rails, Philadelphia	17.50	17.50	17.50	16.50
Carwheels, Chicago	12.75	12.75	12.75	14.00
Carwheels, Philadelphia	*12.00*	12.50	12.00	14.00
Heavy steel scrap, Pittsburgh...	*12.25*	12.50	12.25	13.75
Heavy steel scrap, Chicago.....	*10.50*	10.75	10.50	12.00
Heavy steel scrap, Philadelphia	11.50	11.50	11.25	14.00
Finished Iron and Steel, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.37½
Iron bars, Philadelphia.....	1.42½	1.42½	1.42½	1.40
Iron bars, Pittsburgh	1.60	1.60	1.65	1.40
Iron bars, Chicago.....	*1.40*	1.45	1.50	1.30
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.40
Steel bars, New York.....	1.56	1.56	1.56	1.35
Tank plates, Pittsburgh	1.45	1.45	1.45	1.51
Tank plates, New York.....	1.61	1.61	1.61	1.35
Beams, Pittsburgh	1.45	1.45	1.45	1.51
Beams, New York	1.61	1.61	1.61	1.35
Angles, Pittsburgh	1.45	1.45	1.45	1.51
Angles, New York	1.61	1.61	1.61	1.25
Skelp, grooved steel, Pittsburgh	*1.40*	1.45	1.45	1.30
Skelp, sheared steel, Pittsburgh	*1.45*	1.50	1.50	1.40
Steel hoops, Pittsburgh.....	1.50	1.50	1.60	
Sheets, Nails and Wire, Per Pound to Large Buyers:				
Sheets, black, No. 28, Pittsburgh	*2.20*	2.25	2.25	2.85
Wire nails, Pittsburgh.....	1.65	1.65	1.70	1.65
Cut nails, f.o.b. Eastern mills..	1.75	1.75	1.75	1.70
Cut nails, Pittsburgh.....	1.60	1.60	1.65	1.60
Fence wire, ann'l'd, 0 to 9, Pgh.	1.45	1.45	1.55	1.45
Barb wire, galv., Pittsburgh....	2.05	2.05	2.20	1.95

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville, Per Net Ton at Oven:	Aug. 20, 1913.	Aug. 13, 1913.	July 23, 1913.	Aug. 21, 1912.
Furnace coke, prompt shipment	$2.50	$2.50	$2.50	$2.25
Furnace coke, future delivery..	2.50	2.50	2.50	2.25
Foundry coke, prompt shipment	2.90	2.90	2.75	2.40
Foundry coke, future delivery..	3.00	3.00	3.00	2.50

Metals, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	16.00	16.00	14.50	17.65
Electrolytic copper, New York	15.75	15.75	14.37½	17.60
Spelter, St. Louis.....	**5.70**	5.50	5.25	6.95
Spelter, New York.....	**5.85**	5.65	5.40	7.10
Lead, St. Louis.....	**4.67½**	4.40	4.22½	4.40
Lead, New York.....	**4.75**	4.50	4.35	4.50
Tin, New York.....	*41.25*	41.75	42.00	46.20
Antimony, Hallett's, New York	7.75	7.75	7.75	7.87½
Tin plate, 100-lb. box, Pittsburgh	*$3.50*	$3.60	$3.60	$3.50

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.; New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909..... .20 to	.80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $28 to $28.50. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.45; galvanized, $1.85. Galvanized barb wire, to jobbers, $2.05; painted, $1.65. Wire nails, to jobbers, $1.65.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized	2.10	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight), in effect from August 8, 1913, and iron pipe (full weight), from June 2, 1913:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜.....	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld.

2	76	67½	1¼	56	45
2½ to 6.....	78	69½	1½	67	56
7 to 12	75	64½	2	68	58
13 to 15	52	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted.

1 to 3, butt.....	78	69½	1 to 1½, butt	70	59
2, lap	74	65½	2, butt	70	59
2½ to 6, lap.....	76	67½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4 lap.....	68	59

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜.....	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½.....	77	70½	¾ to 1½	71	62
2 to 3	75	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends.

2	73	64½	1½	65	59
2½ to 4	75	66½	2	66	58
4½ to 6	74	65½	2½ to 4	70	61
7 to 8	67	56½	4½ to 6	69	60
9 to 12	62	51½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends.

½	63	56½	½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends.

2	63	56½	2	55	49
2½ to 4	65	58½	2½ to 4	60	54
4½ to 6	64	57½	4½ to 6	59	53
7 to 8	57	46½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 29, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.		*Standard Charcoal Iron.*	
1¼ and 2 in.....	60	1½ in.	44
2¼ in.	57	1¾ and 2 in.....	48
2½ and 2¾ in.....	63	2¼ in.	44
3 and 3¼ in.....	67	2½ to 2¾ in.....	53
3½ to 4½ in.....	69	3 and 3¼ in.....	55
5 and 6 in.....	63	3½ to 4½ in.....	58
7 to 13 in.....	60	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.60
Nos. 9 to 10	1.65
Nos. 11 and 12	1.70
Nos. 13 and 14	1.75
Nos. 15 and 16	1.85

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	1.85 to 1.90
No. 12	1.85 to 1.90
Nos. 13 and 14	1.90 to 1.95
Nos. 15 and 16	1.95 to 2.00
Nos. 17 to 21	2.00 to 2.05
Nos. 22 and 24	2.05 to 2.10
Nos. 25 and 26	2.10 to 2.15
No. 27	2.15 to 2.20
No. 28	2.20 to 2.25
No. 29	2.25 to 2.30
No. 30	2.35 to 2.40

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.25 to 2.30
No. 12	2.35 to 2.40
Nos. 13 and 14	2.35 to 2.40
Nos. 15 and 16	2.50 to 2.55
Nos. 17 to 21	2.65 to 2.70
Nos. 22 and 24	2.80 to 2.85
Nos. 25 and 26	2.95 to 3.00
No. 27	3.10 to 3.15
No. 28	3.25 to 3.30
No. 29	3.40 to 3.45
No. 30	3.55 to 3.60

Pittsburgh

PITTSBURGH, PA., August 20, 1913.

Prices of iron and steel products have held fairly steady during the week with the exception of plates. Some of the smaller mills in this district and in eastern Ohio are offering ¼-in. and heavier plates for fairly prompt delivery at 1.40c., Pittsburgh. The two leading makers in this city state they are holding firmly to 1.45c., having all the business on their books that they can take care of in the next 60 to 90 days. Prices of sheets seem to have settled to the basis of 1.65c. for Nos. 9 and 10 blue annealed, 2.20c. for No. 28 black and 3.25c. for No. 28 galvanized. These lower prices have induced heavy contracts, some for delivery up to July 1 next year or further, the automobile builders and implement makers having been large buyers. The market on Bessemer pig iron is firmer and prices are 25c. to 35c. a ton higher. A scarcity in supply has developed and some sellers believe that Bessemer will be $16, Valley furnace, or higher, within a short time. Prices of basic are not much better, sales having been made in the past few days at $14 at furnace, though some makers are quoting 25c. to 50c. a ton higher. Offerings of steel billets and sheet bars by outside mills are freer at prices about 50c. a ton less than are quoted by the leading makers. The coke market continues firm at $2.50, but there is no new buying. Some makes of blast furnace coke running to 1.15 per cent. in sulphur are being offered as low as $2.35 at oven. The scrap market has lost the ground it gained lately and is dull and neglected, with some grades slightly lower. Lap-weld pipe and steel bars are the two most active items on the list of finished iron and steel. Pipe mills are pretty well filled to the end of the year and prices are strong.

Pig Iron.—Bessemer is stronger, and there seems to be a scarcity in the supply. One prominent Shenango Valley pig-iron maker will probably take a furnace off basic and put it on Bessemer in the near future to meet the increased demand. We note sales of 400, 600, 1000 and 2500 tons of standard Bessemer for August-September delivery at $15.75 to $15.85, Valley furnace, with reports that $16 has been paid in one or two cases. The sale of 2500 tons may possibly be increased to 5000 tons before the week is out. The improvement in Bessemer is not reflected in basic. We note sales of 8000 to 10,000 tons of basic for delivery over the year at $14, Valley furnace, but some sellers are holding at $14.25 to $14.50 at furnace. There is a fair movement in foundry iron, and prices are steady on the basis of $14 for No. 2 at furnace. There is a moderate inquiry for gray forge, but consumers are pretty well covered for some time ahead. We quote: Bessemer, $15.75 to $15.85; basic, $14 to $14.25; malleable Bessemer, $13.75 to $14; No. 2 foundry, $14; gray forge, $13.35, all at Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being 90c. a ton.

Steel Billets and Sheet Bars.—Offerings of billets and sheet bars, especially the latter, by outside mills, are freer, and much lower prices are being named than asked by the leading makers. A large consumer of sheet bars has bought 3000 tons for reasonably prompt delivery at $25.50 delivered, netting the seller less than $25. Both billets and sheet bars are being offered, either Bessemer or open-hearth stocks at $2 or more under what has heretofore been regarded as the regular market. We quote Bessemer and open-hearth billets for prompt delivery and also for shipment over the remainder of the year at $25, and Bessemer and open-hearth sheet bars for the same delivery at $25.50, maker's mill, Pittsburgh or Youngstown. We quote forging billets at $32 and axle billets at $28, maker's mill.

Steel Rails.—A number of small orders for standard sections are being placed which aggregate a fair tonnage. The new open-hearth plant of the Carnegie Steel Company at Bessemer is coming along, and it is expected that three or four of the furnaces will be ready for operation early in September. There is an active demand for light rails, particularly from coal mining companies, but purchases from traction lines have been light practically the entire year. The Carnegie Steel Company received new orders and specifications for light rails the past week for over 3000 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—The New York, New Haven & Hartford has bought 100 steel passenger cars and the Standard Oil Company of Indiana has placed 800 steel gondolas and 500 steel hoppers with the American Car & Foundry Company. The Carnegie Steel Company will furnish the plates and shapes, close to 30,000 tons, for 2000 70-ton steel hoppers to be built by the Standard Steel Car Company at its Butler shops for the Chesapeake & Ohio Railroad. Nothing is known here of the report that the Pittsburgh Steamship Company, one of the subsidiaries of the United States Steel Corporation, will build three new ore boats and no inquiries have been received for the plates and shapes. Reports that leading mills had cut the price of plates to 1.40c. are denied, but it is true that some of the smaller plate mills in the Pittsburgh district and eastern Ohio are selling at 1.40c. for reasonably prompt delivery. We quote ¼-in. and heavier plates for prompt or forward delivery at 1.40c. to 1.45c. Both the Carnegie Steel Company and the Jones & Laughlin Steel Company state they are adhering rigidly to the higher price.

Structural Material.—Considerable new work has been placed the past week. The McClintic-Marshall Construction Company has taken 2500 tons for the first of the four units to comprise the new plant of the American Zinc & Chemical Company, Burgettstown, Pa., 1800 tons for a new power plant for the Semet-Solvay Company, Syracuse, N. Y., 1200 tons for a freight car repair shop for the Lake Shore & Michigan Southern, Ashtabula, Ohio, 400 tons for new steel buildings for the Aluminum Company of America, New Kensington, Pa., and 400 tons for steel buildings for the Kansas Fertilizer Company, Little Rock, Ark. The Fort Pitt Bridge Works has taken the steel work for the proposed subway for the Public Service Department at Alliance, Ohio, and the American Bridge Company has taken 3500 tons for new buildings for the Minnesota Steel Company at Duluth, Minn. We continue to quote beams and channels up to 15 in. at 1.45c., Pittsburgh. Small lots from warehouse for prompt delivery are bringing from 1.60c. up, depending on the size of the order and the deliveries wanted.

Wire Rods.—New demand is quiet, but prices are fairly steady. We quote Bessemer, open-hearth and chain rods at $28, Pittsburgh.

Ferroalloys.—The recent reduction of $2.50 a ton on English 80 per cent. ferromanganese, or from $58.50 to $56, seaboard, has not as yet brought out any new business of moment, consumers evidently expecting still lower prices. In fact, for some little time ferromanganese has been offered and sold in carload lots at $55. It is probable that a large increase will be made to the domestic ferromanganese output in the near future which will reduce materially the amount of foreign used in this country. Carload lots of ferromanganese are obtainable at $55, seaboard, the freight rate to Pittsburgh district being $2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons or 600 tons, $74; over 600 tons, $73, Pittsburgh.

Muck Bar.—Owing to the shut down since July 1 of three of the larger muck bar mills in the Pitsburgh and Youngstown districts, muck bar is scarce and higher prices are being quoted. The demand is not active, as there has been a falling off to some extent in operations of some of the bar-iron mills. We quote best grades, from all pig iron, at $31 to $31.50, Pittsburgh.

Skelp.—Operations among the skelp mills are active, the new demand being heavy, and the mills are filled up for several months ahead. The recent reduction in prices on butt-weld pipe is reflected in slightly lower prices on steel skelp being made by some of the mills. We quote grooved steel skelp, 1.40c. to 1.45c.; sheared steel skelp, 1.45c. to 1.50c.; grooved iron skelp, 1.65c. to 1.75c.; sheared iron skelp, 1.70c. to 1.75c., all delivered to buyers' mills in the Pittsburgh district. We note a sale of 1000 tons of grooved steel at 1.40c. delivered.

Iron and Steel Bars.—A feature of the market is the heavy demand for steel bars for reinforcing purposes, this having materially expanded in the past two or three weeks. Mills report that they are much behind in deliveries on such bars, and if the demand keeps up they will get still further back. The consumption of bars for reinforcing purposes will be much in excess of last year. On merchant steel bars the new demand is fair, but most consumers are covered on long time contracts against which specifications are coming in quite freely. The leading mills have actual orders on their books sufficient to take their entire output of steel bars for the next two or three months. The new demand for iron bars has quieted down, but the market is fairly strong because of the fact that the supply of muck bar is scarce. We quote steel bars for forward delivery at

1.40c. and for shipment from warehouse in small lots at 1.90c. We quote iron bars at 1.60c. to 1.70c. The mills continue to charge $1 extra per ton for twisting ¾-in. and larger steel bars and $2 extra for ½ to ⅝ in. In some cases these extras are being shaded.

Sheets.—Heavy contracts for blue annealed, black and galvanized sheets have been placed with leading mills. Such consumers as the Ford Motor Company, the International Harvester Company and others have covered nearly their entire requirements for some time ahead. The new demand from the general trade is also better, and the opinion is growing that prices on sheets have about reached bottom. It is stated that on most of the large business recently closed blue annealed sheets were on the basis of 1.65c. for Nos. 9 and 10 gauge, 2.20c. to 2.25c. for No. 28 black and 3.25c. for No. 28 galvanized, but it is probable that in some isolated cases these prices were slightly shaded. We quote Nos. 9 and 10 blue annealed sheets at 1.65c.; No. 28 Bessemer black, 2.20c. to 2.25c.; No. 28 galvanized, 3.25c.; No. 28 tin mill black plate, 2.15c. to 2.20c., and No. 30, 2.20c. to 2.25c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Specifications have been coming in more freely, and leading mills state they have now actual orders on their books that will take the larger part of their entire output over the remainder of this year. Labor troubles since July 1 at two of the more important independent plants have thrown a good deal of business to other mills which are helping out the company on its contracts. This week the American Sheet & Tin Plate Company is operating to 84 per cent. of its hot tin mill capacity. There is not much new demand, but any important business being placed is on the basis of about $3.50 per base box. We quote 100 lb. cokes at $3.50 to $3.60 and 100 lb. ternes at $3.35 to $3.45, Pittsburgh.

Spikes.—The new demand is reported a little better, but railroads are placing orders mostly for small lots and no large inquiries are in the market. Some of the spike makers are seeking new business more actively. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.65 to $1.70, and small railroad and boat spikes in carload and larger lots at $1.75 to $1.80 per 100 lb., f.o.b. Pittsburgh.

Bolts and Rivets.—The new demand for nuts, bolts and rivets is fair, but mostly for small lots, consumers not desiring at present to anticipate requirements. Prices on rivets are being shaded about $2 a ton on desirable orders, and the regular discounts on nuts and bolts are also being shaded. Makers have pretty well caught up on back orders and consumers are now able to get prompt deliveries. We quote button-head structural rivets at $2 and cone-head boiler rivets at $2.10 in large lots, terms 30 days net, less 2 per cent. for cash in 10 days. Regular discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 5% off
Small carriage bolts, rolled threads	75 and 10% off
Large carriage bolts	70 and 2½% off
Small machine bolts, cut threads	75 and 10% off
Small machine bolts, rolled threads	75, 10 and 5% off
Large machine bolts	70 and 7½% off
Machine bolts with C.P.C. and T nuts, small	75 and 5% off
Machine bolts with C.P.C. and T nuts, large	70% off
Square hot pressed nuts, blanked and tapped	$5.70 off list
Hexagon nuts	$6.30 off list
C.P.C. and R. square nuts, tapped and blank	$5.70 off list
Hexagon nuts, ⅝ and larger	$6.60 off list
Hexagon nuts smaller than 9/16	$7.20 off list
C.P. plain square nuts	$5.20 off list
C.P. plain hexagon nuts	$5.50 off list
Semi-finished hexagon nuts, ⅝ and larger	85% off
Semi-finished hex. nuts smaller than 9/16—85 and 10% off	
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off
Standard cap screws	75, 10, 10 and 7½% off
Standard set screws	75, 10, 10 and 7½%

Wire Products.—The recent reduction in prices of wire nails and wire has stimulated the demand to some extent, mills reporting that they have entered more orders than for some time. It is the general belief that present prices on wire products will not remain in force for any considerable length of time, and that about September 1, or not later than September 15, an advance will be made. In the meantime consumers are expected to cover for their requirements for some time ahead. We quote: Wire nails to jobbers, $1.65; cut nails, $1.60; plain annealed wire, $1.45; galvanized barb wire, $2.05, and painted barb wire, $1.65, f.o.b. Pittsburgh, per 100 lb., usual terms, actual freight added to point of delivery.

Shafting.—It is stated that a number of leading consumers have closed in the past week or two for their entire requirements for a considerable time ahead. Prices are said to be a little firmer, but are not actually higher. Regular discounts on cold-rolled shafting are 60 off in carload lots and 55 in small lots, but on desirable orders 62 is still being quoted.

Hoops and Bands.—The new demand is only for small lots, consumers being covered for some time ahead. Specifications from keg and barrel makers are coming in quite freely, but the mills are gradually catching up on back deliveries and consumers can obtain reasonably prompt shipments. The open price on hoops is still 1.60c., but 1.50c. is being done in most cases. Bands are 1.40c., with extras as per the steel bar card.

Cotton Ties.—Practically all of the business for this year has been placed, and it is said the bulk of it went at 84c. per bundle.

Merchant Steel.—There is not much new buying, and only in small lots, consumers being covered for some time ahead. Mills report that specifications against contracts are coming in at a fair rate, but they are pretty well caught up on back orders, and consumers can now obtain quicker shipments than for some time. Prices are being shaded. Nominal prices are as follows: Iron finished tire, 1½ x ½ in. and larger, 1.40c., base; under 1½ x ½ in., 1.55c.; planished tire, 1.60c.; channel tire, ¾ to ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.85c. We quote cold rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Old Material.—Conditions in the scrap trade are about as bad as they were before the improvement of several weeks ago, which was short lived. There is practically no new inquiry, consumers evidently being covered ahead, and prices on most grades are weak. The statement in this report last week that the Carnegie Steel Company has paid $15.25 for the heavy steel scrap in the list of the Pennsylvania railroad was a typographical error, and should have read $13.25 per gross ton, delivered. The new demand for borings and turnings is not so active, two leading consumers at Brackenridge, Pa., being covered for some time and out of the market. Prices on bundled sheet scrap are lower, more of it being offered than wanted. We note sales of about 1000 tons of bundled sheet scrap at $8, delivered at buyer's mill, and also about 2000 tons of selected heavy steel scrap at $13, delivered, but the latter could now be bought at a slightly lower price. Dealers quote as follows, per gross ton, for delivery in the Pittsburgh district:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$12.75 to $13.00
Ordinary steel scrap	12.25 to 12.50
†Compressed side and end sheets scrap	10.50
No. 1 foundry cast	12.75 to 13.00
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.00 to 8.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to 14.75
No. 1 railroad malleable stock	11.50 to 11.75
Grate bars	8.25 to 8.50
Low phosphorus melting stock	15.75 to 16.00
Iron car axles	24.50 to 25.00
Steel car axles	17.50 to 17.75
Locomotive axles, steel	21.00 to 21.50
Locomotive axles, iron	25.50 to 26.00
No. 1 busheling scrap	12.00 to 12.25
No. 2 busheling scrap	7.50 to 7.75
Old carwheels	13.75 to 14.00
*Machine shop turnings	6.75 to 7.00
*Cast-iron borings	8.25 to 8.50
†Sheet bar crop ends	14.00 to 14.25
Old iron rails	14.50 to 14.75
No. 1 railroad wrought scrap	13.75 to 14.00
Heavy steel axle turnings	9.00 to 9.25
Stove plate	8.25 to 8.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Standard Pipe.—So far the reduction of one point, or $2 a ton, in prices of butt-weld pipe, effective from August 8, has not stimulated the demand. In fact for some time butt-weld pipe has been selling at the lower prices, so that consumers are not getting it any cheaper than before the reduction was made. The new demand for lap-weld and line pipe continues heavy, and the mills are filled up for some months. The Republic Iron & Steel Company has taken a large contract for pipe for development work for delivery to the T. W. Phillips Oil & Gas Company. Discounts on iron and steel pipe are being well maintained.

Boiler Tubes.—The new demand continues heavy, but the mills are practically filled for the remainder of the year. The new demand for merchant tubes is only fair, but for seamless tubing is heavy. Discounts are being firmly held.

Coke.—Producers are holding furnace coke firm at $2.50 per net ton at oven, but there is no demand. In the past several weeks the output has been restricted materially, a good many ovens having been shut down. How long the present condition will continue is a question, but it is believed that unless some new demand for furnace coke comes up in the near future there will be a sag in prices. The demand for foundry coke is fairly heavy, and prices are firm. We quote standard furnace coke for prompt and forward delivery at $2.50 and foundry at $2.85 to $3 per net ton at oven. The Connellsville Courier gives the output of the Upper and Lower Connellsville regions for the week ended August 9 as 392,825 tons, an increase over the previous week of 7500 tons. It is still strongly contended that the figures of output printed by the Courier are wrong and that the actual output of coke is much less than stated.

Hickman, Williams & Co., dealers in pig iron, steel, coke and ferroalloys, have taken additional rooms Nos. 2448-49-50 in the Oliver Building, Pittsburgh. Their business has grown very rapidly and more room and help were necessary. J. O. Yoder, formerly connected with the South Side works of the Jones & Laughlin Steel Company, Pittsburgh, is now in the sales offices of Hickman, Williams & Co. in Pittsburgh, the others on the staff being T. Coleman Ward and T. A. Arthur.

Chicago

CHICAGO, ILL., August 20, 1913.—(*By Telegraph.*)

Little of interest has developed the past week. No great volume of business has been had in any particular product, yet on the whole the market is fairly firm and producers as a rule are not inclined to make concessions to consumers. In pig iron there has been a noticeable falling off in both inquiries and sales, with a number of small transactions closed quietly which afford a fair volume for the season. Buyers who have yet to cover are showing a spirit of conservatism, an instance of which is to be seen in a large electrical supply house which has reduced its original inquiry for iron to a material degree. On the other hand, the market shows more strength and higher prices on several brands are noted. Iron bars show a small decline in price, due to the fact that railroads have not specified as freely as is customary. On plates the ordinary price in this territory is 1.63c., despite reports of lower ruling prices, and it is very probable that lower figures may have been induced in only special instances and do not constitute a market. Sheets are in good demand at ruling quotations, with less indications of further weakness. The lower prices for wire products have not influenced any material increase in orders. The market on scrap broke the past week, owing to the inability of the dealers to dispose of tonnage in accordance with their anticipations in purchasing, and it is probable that even lower prices will prevail for a time. However, on the whole, an optimistic feeling prevails and the principal interests believe that with easier money conditions which now exist the usual amount of business will soon be enjoyed.

Pig Iron.—Following a material reduction of stocks, the charcoal-iron interests are less inclined to the low prices which have recently prevailed and higher quotations are now being made. Virginia furnaces are also notifying their agents of an advance in price and some of the Northern producers are inclined to higher quotations. No transactions of special interest are to be noted, though the aggregate tonnage obtained through small contracts is satisfactory. Southern irons are more firmly established on the basis of $11, Birmingham, and, while due to certain circumstances, it is still possible to obtain iron for immediate delivery on a basis of $10.75 for No. 2, buyers do not seem averse to closing at the price of $11. This week has marked a low level for inquiries and orders have consisted of small scattered lots. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$15.00 to $16.00
Northern coke foundry, No. 1	15.50 to 16.00
Northern coke foundry, No. 2	15.00 to 15.50
Northern coke foundry, No. 3	14.50 to 15.00
Southern coke, No. 1 foundry and No. 1 soft	15.60 to 16.10
Southern coke, No. 2 foundry and No. 2 soft	15.10 to 15.60
Southern coke, No. 3	14.60 to 15.10
Southern coke, No. 4	14.10 to 14.60
Southern gray forge	14.10 to 14.60
Southern mottled	13.85 to 14.35
Malleable Bessemer	15.00 to 15.50
Standard Bessemer	18.40
Basic	15.00 to 15.50
Jackson Co. and Kentucky silvery, 6 per cent.	18.40
Jackson Co. and Kentucky silvery, 8 per cent.	19.40
Jackson Co. and Kentucky silvery, 10 per cent.	20.40

Sheets.—An increase in demand at quoted prices is noted, though mills are active in seeking business and deliveries are quite good. Some weakness is still apparent, especially as regards galvanized products. We quote No. 28 galvanized at 3.43c. to 3.48c.; No. 10 blue annealed, 1.83c. to 1.88c.

The demand out of store has been affected to some extent by deliveries which it is impossible to obtain from mills, but the orders are reported fair, without change in previous quotations.

(*By Mail*)

Rails and Track Supplies.—Very little business is being placed. Railroads seem inclined to postpone buying as long as possible, and it is not believed that any great amount of rail business will be had before the first of next year. There is the usual run of orders for track material occasioned by repair work which must be done without delay. No change of prices is reported. We quote standard railroad spikes at 1.75c. to 1.80c., base; track bolts with square nuts, 2.25c. to 2.30c., base, all in carload lots, Chicago; tie plates, $32 to $34, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—While there are no large building projects apparent for the immediate future, miscellaneous orders for small tonnages are forming an aggregate which is fairly satisfactory to the fabricators, especially in view of the fact that railroad contracts for bridge material are expected to add considerably to the work in hand. The past week the American Bridge Company was awarded a contract for 3500 tons of structural material for a number of buildings of the Minnesota Steel Company, Duluth, Minn.; contract for 500 tons was awarded to the Central Iron Works for the Young Men's Institute—Lodge Building, San Francisco, Cal.; the Judson Mfg. Company will fabricate 200 tons to be used in an extension to the Sacred Heart Academy, Menlo Park, Cal.; the Northwest Steel Company will supply 290 tons for public dock No. 1, Portland, Ore.; the Coca-Cola Company has placed an order for 684 tons with Holmes, Pyott & Co. for an extension to its building on Wabash avenue in this city; the Wisconsin River Power Company has awarded contract to the Lakeside Bridge & Steel Company for 379 tons for gates and appurtenances to be used at Prairie du Sac, Wis. We quote for Chicago delivery, from mill, 1.63c.

Orders for structural material out of store are reported of satisfactory volume. We quote for Chicago delivery, from store, 1.95c.

Bars.—An increase in specifications against contracts for steel bars is reported. Mills are fairly well taken care of in this line and look forward to an increasing activity through the fall. In bar iron, buyers are showing more conservatism. The market is soft and on desirable inquiries a price of 1.40c. is being made. No purchases of large size are noted, though the usual amount of small new business is being enjoyed in both steel and iron, an increase in orders from railroads being most favorably regarded. We quote for mill shipment as follows: Bar iron, 1.40c. to 1.45c.; soft steel bars, 1.58c.; hard steel bars, 1.50c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

Jobbers report a normal amount of business for the season, without concessions in price. For delivery from store, we quote soft steel bars, 1.85c.; bar iron, 1.85c.; reinforcing bars, 1.85c. base, with 5c. extra for twisting in sizes ½ in. and over, and usual card extras for smaller sizes; shafting 53 per cent. off.

Plates.—Deliveries of plates continue to show improvement, and mills are more aggressive in seeking orders. Specifications against contracts are supplying the principal volume, there being little new business. The Chicago & Illinois Midland has inquiries out for 250 cars, and Swift & Co. for a similar number. The Chicago, Burlington & Quincy is also reported to be inquiring for a small lot. We quote for Chicago delivery, from mill, 1.63c.

Cast-Iron Pipe.—No awards of contracts are reported. The market is quiet, with very little new inquiry. Kenmore, Ohio, is to open bids to-day for 1600 tons, varying from 4-in. to 12-in., and Akron, Ohio, is in the market for 800 tons. No change of prices has been made. We quote as follows per net ton, Chicago: Water pipe, 4-in., $28; 6 to 12-in., $26; 16-in. and up, $25, with $1 extra for gas pipe.

Wire Products.—Lower prices, which became effective last week, do not appear to have brought out any great amount of new business in this territory. Stocks of jobbers are low and a buying movement, when begun, should attain most satisfactory proportions. For the present, however, buyers seem content to specify for immediate requirements only. Prices to jobbers are as follows: Plain wire, No. 9 and coarser, base, $1.63; wire nails, $1.83; painted barb wire, $1.83; galvanized, $2.20; polished staples, $1.83; galvanized, $2.15, all Chicago.

Old Material.—Unwillingness of consumers to meet dealers' views as to prices, together with deliveries on purchases from railroads and other sources which are being made, resulted in a decided slump in prices the last week in this market. Railroad offerings were absorbed but the premiums paid a few weeks ago have disappeared. Consumers do not appear anxious to anticipate their requirements and the general opinion is that the market will reach a still lower level. A list from the Chicago, St. Paul, Minneapolis & Omaha for 500 tons was closed to-day; other railroad lists include 1200 tons from the Chicago & Eastern Illinois and about 1000 tons from the Grand Trunk, of which approximately 300 tons is old car wheels. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$14.00 to $14.50
Old steel rails rerolling	12.00 to 12.50
Old steel rails, less than 3 ft.	11.25 to 11.75
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	12.75 to 13.25
Heavy melting steel scrap	10.50 to 11.00
Frogs, switches and guards, cut apart	10.50 to 11.00
Shoveling steel	10.25 to 10.50
Steel axle turnings	7.25 to 7.75

Per Net Ton.

Iron angles and splice bars	$13.50 to $14.00
Iron arch bars and transoms	13.75 to 14.25
Steel angle bars	10.00 to 10.50
Iron car axles	20.50 to 21.00
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Cut forge	10.00 to 10.50
Steel knuckles and couplers	10.00 to 10.25
Steel springs	10.50 to 11.00
Locomotive tires, smooth	11.75 to 12.25
Machine shop turnings	5.00 to 5.25
Cast and mixed borings	5.00 to 5.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	7.25 to 7.75
Boiler punchings	10.50 to 11.00
No. 1 cast scrap	10.75 to 11.25
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.25 to 9.75
Pipes and flues	8.00 to 8.25

Rivets and Bolts.—Specifications from the implement companies for bolts are being received and other interests are closing for their requirements, though no orders of especial interest are to be noted. Manufacturers continue to seek business quite actively and continued reports of shading are heard. The demand for structural rivets is said to show an increase. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 75-10-7½; cut thread, 75-12½; larger sizes, 70-12½; machine bolts up to ⅜ x 4 in., rolled thread, 75-10-12½; cut thread, 75-10-7½; large size, 70-10-5; coach screws, 80-12½-5; hot pressed nuts, square head, $6 off per cwt.; hexagon, $6.70 off per cwt. Structural rivets, ¾ to 1¼ in., 2.03c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ⅜ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ⅜ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, $5.30, and hexagon, $5.90 off per cwt.

W. Berkley Williams, Baltimore, has been elected vice-president of the Alabama Company, which recently purchased the property of the Alabama Consolidated Coal & Iron Company. The new vice-president is a brother of John Skelton Williams, assistant secretary of the treasury, and of R. Lancaster Williams, president of Middendorf, Williams & Co., Inc., bankers, Baltimore. The president of the Alabama Company is J. William Middendorf.

Philadelphia

PHILADELPHIA, PA., August 19, 1913.

The movement in foundry pig iron has been well sustained and has been accompanied by a gradual hardening of prices. Production continues to decrease. The majority of the Virginia producers have advanced prices 25c. a ton. No important business is moving in steel making irons. The finished material market has been less active. Weakness in plates and shapes continues to be reported. Billets are dull and lower prices are available on competitive business. The old material market is quiet but apparently stronger. Coke is being more freely offered.

Iron Ore.—There is practically an entire absence of interest in either foreign or domestic ores. Importations during the week ended August 16 included 11,850 tons from Cuba, 6000 tons from St. John's and 2500 tons from Venezuela.

Pig Iron.—The moderate lot movement in the higher grades of foundry pig iron has been well sustained, and while a good share of the business closed early last week was on old options at $15.50, delivered, for standard brands of eastern Pennsylvania No. 2 X foundry, there was a decided hardening of prices as the week advanced, with considerable business moving in No. 2 X and No. 2 plain grades at $15.65, $15.75 and even higher. One sale of 1000 to 1500 tons was made late in the week at $15.50, delivered, for No. 2 X, but it is stated that this transaction could not be duplicated. Inquiry is mostly for small lots, although the Baldwin Locomotive Works is in the market for 1000 to 2000 tons of cylinder grade foundry. Eastern Pennsylvania producers are practically a unit on the policy of curtailment of output, rather than piling iron under present conditions. One Lehigh Valley merchant furnace went out last week and the blowing out of another is being considered. Several producers who have but one or two stacks active out of a total of eight or nine are holding at prices ranging from $16.50 to $16.75, delivered, for No. 2 X, but make only scattered odd lot sales at those figures. Malleable casting makers are inquiring more freely and a considerable tonnage of charcoal iron has been sold to both malleable and general foundries. About $18.45, delivered in this district, represents the market for charcoal pig. A decidedly more active movement has developed in Virginia foundry iron. Good sales of the higher grades have been made at $12.75 to $13 at furnace for No. 2 X. Early this week the majority of the Virginia producers advanced quotations 25c. a ton. The Virginia Iron, Coal & Coke Company now holds at $13.25 at furnace for No. 2 X, with silicon 2.25 to 2.75 per cent.; $13 for No. 2 plain, and $12.75 for No. 3 foundry and lower grades. These advances foliowed heavy sales last week to cast-iron pipe makers, made at the old price levels. A purchase of upward of 6000 tons of Virginia iron of various grades was made by a cast-iron pipe maker in that State and a purchase of 5000 to 10,000 tons by a Delaware River melter is rumored. Another Delaware River pipe maker is actively in the market but has not closed for any large block. Northern producers are holding low grade iron at about $15, delivered. Rolling mill forge has not been active, several small inquiries and one of 1000 tons are before the trade and sellers are now quoting $15, delivered, for this grade. Steel making irons have not been active. Basic is uncalled for but nominally held at $15.50, delivered. Sales of Eastern Bessemer, one of 1000 and one of 500 tons, have been made for delivery in this vicinity. Lebanon Valley low phosphorus has been sold at $18 at furnace, while odd lot sales of standard analysis low phosphorus have been made at $23 to $23.50, delivered here. Quotations have an appearance of irregularity, due largely to advances made by some producers which have not been fully met by other sellers. Recent low prices, however, are now no longer available and sellers are maintaining quotations with greater firmness. The following range about represents the market for standard brands, delivered in buyers' yards in this vicinity, although occasional sales are made at 25c. to 50c. above these figures:

Eastern Pennsylvania No. 2 X foundry	$15.65 to $16.00
Eastern Pennsylvania No. 2 plain	15.40 to 15.75
Virginia No. 2 X foundry	15.80 to 16.25
Virginia No. 2 plain	15.75 to 16.00
Gray forge	14.75
Basic	15.25
Standard low phosphorus	23.00 to 23.50

Ferroalloys.—Consumers, unless in immediate need, are not placing orders for 80 per cent. ferromanganese at $56, seaboard. Further reductions are expected, particularly if it goes on the free list. Current sales

are small, and on some odd lot business lower than $56 has been done. Importations of ferromanganese last week aggregated 715 tons at this port. Ferrosilicon remains quiet.

Billets.—There is some price uncertainty in the billet market. The demand continues light, and while small current orders for basic open-hearth rolling billets command $28 delivered here, there is no doubt that this price could be shaded if desirable business came out. Specifications on contracts come to the mills freely. A moderate demand for forging billets is reported, with ordinary analysis steel at $33, minimum, Eastern mill.

Plates.—Consumers continue to make efforts to get concessions, and while it is rumored that quotations have been shaded, the reports have not been substantiated as far as general business is concerned. This appears to be verified in the fact that purchasers, who in instances have claimed that better than 1.60c. delivered here, could be done on lots of a few hundred tons, have come back and placed the business with mills at that figure. The bulk of the heavy plate business is in miscellaneous orders, with comparatively good specifications on contracts. In the aggregate, business is materially below mill capacity. Further inquiries for several thousand tons of ship plates are before the trade. On large tonnages there is little doubt that concessions would be available.

Structural Material.—Current business is light. Some sellers have not had an inquiry for anything over 100 tons in one lot for over a week. The bulk of the orders have been confined to small miscellaneous business, although several 1000-ton lots are under negotiation, few originating in this immediate vicinity. New plans for the proposed Penn Square office building will cut down the steel tonnage more than half. Several moderate building and pier structures in Baltimore are being figured on. Prices are by no means strong, the market has not been tested on sharply competitive business, but on current small lots 1.60c., delivered, is generally quoted.

Sheets.—Eastern mills are receiving an increasing volume of small orders and are being crowded for shipments on business of this character, which is usually wanted for early delivery. For orders of this class Eastern mills readily obtain 1.90c., delivered here, for No. 10 blue annealed sheets, although on business involving any material quantity 1.80c. could no doubt be done. Western sheets are generally reported as being easy.

Bars.—A trifle larger volume of small business in common iron bars has been before the trade, but the market is not strong. Ordinary iron bars can be readily obtained at 1.42½c. to 1.47½c., delivered, in this district, and some mills might shade the inside price on desirable business. Steel bars are firm at 1.55c., delivered here.

Old Material.—Actual sales are unimportant. Steel mills have, in instances, advanced offers for No. 1 heavy melting steel to $11.50, delivered, but very little comes out. Somewhat higher figures would no doubt be paid for round lots. Low phosphorus steel scrap is in better demand. Rolling mills show more interest in some grades of material, and light sales of No. 1 railroad wrought have been made at slightly higher prices. Borings and turnings are quiet. Quotations are still somewhat irregular and to a large extent nominal; an approximate range for delivery in buyers' yards in this district, covering eastern Pennsylvania, taking freight rates varying from 35c. to $1.35 per gross ton, is as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap (nominal)	15.50 to 16.00
Old steel axles (nominal)	17.50 to 18.00
Old iron axles (nominal)	25.00
Old iron rails	17.50 to 18.00
Old carwheels	12.00 to 12.50
No. 1 railroad wrought	14.50 to 15.00
Wrought-iron pipe	11.00 to 11.50
No. 1 forge fire	9.50 to 10.00
No. 2 light iron (nominal)	6.00
No. 2 cut busheling (nominal)	8.00 to 8.25
Wrought turnings	8.00 to 8.50
Cast borings	8.00 to 8.25
Machinery cast	12.75 to 13.25
Grate bars, railroad	9.00 to 9.50
Stove plate	9.00 to 9.50
Railroad malleable (nominal)	11.00 to 11.50

Coke.—With the consumption of furnace coke falling off, this grade is being more freely offered by some producers. On contract Connellsville furnace coke, prices are maintained at $2.50 at oven, with prompt coke available at the same price. Coke from other districts is offered at slightly lower prices. Moderate sales of contract foundry coke are being made at $3 to $3.25 at oven, depending on quality. For delivery in buyers' yards, in this vicinity, the following range of prices, per net ton, is named:

Connellsville furnace coke	$4.25 to $4.65
Connellsville foundry coke	4.90 to 5.35
Mountain furnace coke	4.00 to 4.25
Mountain foundry coke	4.50 to 4.75

Cincinnati

CINCINNATI, OHIO, August 20, 1913.—*(By Telegraph.)*

Pig Iron.—The latter part of August has always been a dull period in this market, and the small business under negotiation proves that this year will be no exception. As the majority of the city foundries are still idle on account of labor troubles there is practically no local buying except for carload quantities needed by the stove makers for filling in purposes. The largest general inquiry out calls for 2000 tons of mixed foundry and malleable for an Ohio manufacturer. A number of tentative requests for prices from Indiana and Ohio melters have been received on first quarter business, but it is understood that these were only issued to draw out the furnace operators' views for this delivery. In spite of the quiet conditions prevailing Southern iron is firmer and practically all furnaces are holding for $11, Birmingham basis, for any delivery this year, although it is possible to obtain some prompt shipment iron slightly below this figure. A few holders of speculative iron are said to be willing to accept business as low as $10.50, but it is understood that a strictly No. 2 foundry grade cannot be furnished. At the present time practically all sales that are principally for small tonnages are being made at the furnace price quoted above. Northern foundry is slow and unchanged at $14, Ironton. No sales of any magnitude have been reported within the past week. There are no inquiries out for basic, as practically all consumers in this territory have covered for this year's needs. Based on freight rates of $3.45 from Birmingham and $1.20 from Ironton we quote f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$14.50 to $15.00
Southern coke, No. 2 foundry and 2 soft	14.00 to 14.50
Southern coke, No. 3 foundry	13.50 to 14.00
Southern, No. 4 foundry	13.00 to 13.50
Southern gray forge	12.50 to 13.00
Ohio silvery, 8 per cent. silicon	18.20 to 18.70
Southern Ohio coke, No. 1	16.20 to 16.70
Southern Ohio coke, No. 2	15.20 to 15.70
Southern Ohio coke, No. 3	14.95 to 15.45
Southern Ohio malleable Bessemer	15.20 to 15.45
Basic, Northern	15.20 to 15.45
Lake Superior charcoal	16.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—The market is very quiet. Shipments on contracts are also slow, and it is stated that the producers in all fields are closely watching the rate of consumption, and are not disposed to make much effort for new business, but are only willing to take care of old customers. While reports differ as to the situation in the Connellsville district, it is generally understood that there is no oversupply of either furnace or foundry grades. Prices continue firm, and while $2.50 per net ton at oven is the average minimum quotation for either prompt or contract business on leading 48-hr. brands, in all three districts there is a tendency to ask a slight advance over this figure. Pocahontas operators, as a rule, are demanding $2.75. Although foundry coke is selling slowly, market quotations have been strengthened, and $3 per net ton at oven is minimum, with a few interests unwilling to take on business below $3.25.

Finished Material.—Indications point to a slackening up of business in a number of lines, but, while sheets have been somewhat weak lately, the demand is better than it was last week. Local business in all finished lines is scarce, and a partial settlement of the teamsters' strike has not, up to the present time, led to larger trade. It is quite probable that normal conditions will be resumed shortly and builders will then require a large tonnage of reinforcing concrete rods and other structural steel material. The local warehouse price on steel bars is 1.95c. to 2c., and on structural shapes at 2c. to 2.10c.

Old Material.—For three or four days last week there was an outside demand for a few different kinds of scrap, included in which were burnt scrap, No. 1 railroad wrought and bundled sheet. This demand has now fallen off; while it was not of sufficient magnitude to change prices, it had a stiffening effect for the time being. The minimum quotations given below repre-

cent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$7.25 to	$7.75
Old iron rails	12.25 to	12.75
Relaying rails, 50 lb. and up	19.75 to	20.25
Rerolling steel rails	11.25 to	11.75
Melting steel rails	9.50 to	10.00
Old carwheels	11.00 to	11.50

Per Net Ton

No. 1 railroad wrought	$9.25 to	$9.75
Cast borings	4.75 to	5.25
Steel turnings	4.75 to	5.25
No. 1 cast scrap	9.00 to	9.50
Burnt scrap	6.50 to	7.00
Old iron axles	16.75 to	17.25
Locomotive tires (smooth inside)	10.25 to	10.75
Pipes and flues	6.00 to	6.25
Malleable and steel scrap	7.50 to	8.00
Railroad tank and sheet scrap	4.75 to	5.25

Cleveland

CLEVELAND, OHIO, August 19, 1913.

Iron Ore.—Ore firms that expected there would be some additional buying of ore in the latter part of the summer have about reached the conclusion if they make any further sales they will be in very small lots and will not be made until near the end of the season of navigation. Shipments from Duluth and Superior, which were seriously interfered with for about two weeks by the strike of the dock laborers, have materially improved and will probably be about normal by the end of the week. Conditions are now about normal at the Missabe dock, but are less satisfactory at the Great Northern dock, where there is still a shortage of workmen. The strike will result in a heavier movement late in the season than would otherwise have been necessary, but it is not expected to result in any curtailment of the season's shipments. We quote prices as follows: Old range Bessemer, $4.40; Mesaba Bessemer, $4.15; old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

Pig Iron.—The market is less active than for several weeks. However, a moderate volume of business is coming out in small lots of foundry iron for delivery in the last half. Foundries in this territory are now well covered for their last half requirements, but some consumers will need additional iron the last month or two of the year. The market is very firm at recent quotations, but very little foundry iron is being sold at prices higher than prevailed a few weeks ago. Foundry iron is still quoted at $14.50, delivered Cleveland, for No. 2, and at $14 to $14.50, local furnace, for outside shipment. Some small lot sales have been made at the latter figure. While Valley furnaces generally quote No. 2 foundry at $14 or higher, $13.75 iron does not appear to have entirely disappeared in the Valley. Among new inquiries is one from a Warren consumer for 500 tons of malleable iron. Ohio silvery iron is weaker. Some sales have been made at $17.50, furnace, for 8 per cent. However, this price is being quoted for delivery the first half of next year. Southern iron is quiet but firm. While some Southern iron has recently been offered at $10.75 for No. 2 for prompt shipment $11 now appears to be the minimum price for any delivery. For prompt shipment and for the last half we quote, delivered Cleveland, as follows:

Bessemer	$16.40
Basic	15.00
Northern No. 2 foundry	$14.50 to 14.90
Southern No. 2 foundry	15.35
Gray forge	14.25
Jackson County silvery, 8 per cent. silicon	18.55 to 19.05

Coke.—Foundries are now well covered for their last half requirements and the market is quiet. Prices on this grade are firm. The general price is $3 net ton, at oven, for prompt shipment and contract. While some coke can still be had at $2.90 a few producers are asking $3. Increased offerings of furnace coke cause some consumers to predict a softening of prices shortly. Some furnace coke is being offered at $2.35, although the generally recognized standard makes are held at $2.50.

Finished Iron and Steel.—Demand in finished lines is light. Specifications are coming out in only a limited volume and there is very little new business. Current orders are confined to small lots for early delivery. Encouraged by rumors of price concessions in the East buyers are working hard to secure lower prices, particularly on plates. However, prices on steel bars, plates and structural material are being maintained by the leading sellers, and in the case of some small lots of shapes sellers are able to get 1.50c., Pittsburgh. The structural market is quiet, but a fair volume of small work is coming out and some of the local fabricators have all of the work they can do for the remainder of the year. The Hunkin-Conkey Construction Company was low bidder for the superstructure of the Superior avenue bridge, Cleveland, requiring over 2700 tons of steel bars and structural material. The bar iron market is very dull and prices are weak and irregular. Local mills continue to quote bar iron at 1.50c. for nearby delivery, but would probably shade this price to 1.40c. for shipment to competitive points. The reduction in the price of wire products recently noted has resulted in a fair volume of business. The present prices, 1.65c. for wire nails and 1.45c. for wire are quoted by all sellers. The rivet market is quiet. While prices are nominally 1.90c., Pittsburgh, for structural rivets and 2c. for boiler rivets, the general selling price is $1 a ton below these quotations. The sheet situation shows no improvement in demand or prices. The quotations of 2.25c. for No. 28 black and 3.25c. for No. 28 galvanized are not being maintained. Warehouse prices are unchanged at 2c. for steel bars and 2.10c. for plates and structural material.

Old Material.—The market is as dull as it has been at any time in the past few months, and the better feeling which recently developed among dealers seems to have largely disappeared. Recently sellers thought there was a possibility of some advance in prices, but now they are not looking for a better market for some time and are more disposed to sell at current quotations. One local consumer is buying heavy melting steel in small lots at $11.25. Sales of old iron rails were reported at $14, or 50 cents a ton or more lower than recent quotations. Sales of busheling at $10 indicate that the market on this grade is slightly firmer. While the market is not firm, other quotations are unchanged. We quote f.o.b., Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	$13.00 to	$13.50
Old iron rails		14.00
Steel car axles	17.00 to	17.50
Heavy melting steel	11.00 to	11.25
Old carwheels	12.50 to	13.00
Relaying rails, 50 lb. and over	23.00 to	25.00
Agricultural malleable	10.00 to	10.50
Railroad malleable	11.00 to	11.50
Light bundled sheet scrap	8.00 to	8.50

Per Net Ton.

Iron car axles	$20.00 to	$21.00
Cast borings	5.75 to	6.00
Iron and steel turnings and drillings	4.50 to	4.75
Steel axle turnings	7.00 to	7.50
No. 1 busheling	10.00 to	10.25
No. 1 railroad wrought	10.50 to	11.00
No. 1 cast	11.00 to	11.50
Stove plate	8.50 to	8.75
Bundled tin scrap	10.00 to	10.50

Birmingham

BIRMINGHAM, ALA., August 18, 1913.

Pig Iron.—While most of the sales recently in Alabama and other Southern territory have been in small lots, ranging from 30 to 300 tons, there is no denying that the pig-iron market has taken on additional strength. The active trading in the last half of July bolstered up the market wonderfully and improved the quotations to a point around $11 for No. 2 foundry. In the sales of small lots, immediate delivery is being asked for, and consumers indicate a willingness to stand a premium of 25 to 50c. on the regular quotation. Despite statements to the effect that some furnace companies have offered iron for the remainder of the year at $10.50, inquiry fails to discover any to be had in the last quarter at that price. Even the more pessimistic market reporters do not go below $10.75. Two or three companies in the Birmingham district the past week sold considerably more than their make. One concern did not deny reports that it had made sales that would call for 2000 tons in the aggregate, the largest of which would hardly amount to 500 tons. One company booked orders amounting to more than 5000 tons. Another selling mostly iron of a special brand managed to book orders for 2500 tons for delivery in the last quarter at $12. Considerable inquiry has been received for low grades, and the export movement, on business placed some time back, is beginning to amount to something. With the exception of the rebuilt furnace of the Woodward Iron Company, which is to resume operations in October, if not before, the plans of curtailment in this section of the country are to be maintained, according to the best information

obtainable. Home consumption is still improving, but the melters here have no trouble in getting their needs supplied from the local manufacturers. The belief is strong that there will be an active demand for pig iron through the remainder of the year. An authoritative statement made by the chief executive of the Sloss-Sheffield Steel & Iron Company recently was to the effect that that company had sold nearly 50,000 tons in July and that the sales in the first half of August were materially in excess of the production. This company has three furnaces in operation. Following are quotations f.o.b. Birmingham:

No. 1 foundry and soft	$11.00 to $11.50
No. 2 foundry and soft	10.75 to 11.00
No. 3 foundry	10.00 to 10.50
No. 4 foundry	9.75 to 10.25
Gray forge	9.50 to 10.00
Charcoal	23.00 to 24.50

Cast-Iron Pipe.—Continued shipments have reduced the accumulated stocks considerably, and there is a better feeling in the market. Four-in. pipe is quoted at $22 and 6-in. and larger are selling at $20 and upward. Inquiries are said to be in hand that will warrant a steady and strong melt at the pipe plants. The new pipe plant at Boyles, near Birmingham, will be ready for operation in a few weeks.

Coal and Coke.—The greatest disturbing element in the local coal business is a shortage of railroad cars with which to handle the product. Several of the smaller coal producers are still selling coal through the larger mining companies. Prices are favorable, and contracts are in hand that will cover deliveries into next spring. There are more miners and mine workers employed in the mines of Alabama today than ever before in the history of the industry. Coke is still in strong demand, foundry coke commanding $3.50 to $4 per net ton at oven, and furnace coke from $2.50 to $3.

Old Material.—Little is being sold these days, though the yards are well supplied. Improvement in the pig-iron market is helping out some in old material, and the expectations are that a steady business will be realized shortly. Following are quotations, per gross ton, f.o.b. Birmingham:

Old iron axles (light)	$15.00 to $15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Tram carwheels	10.50 to 11.00
Standard carwheels	12.00 to 12.50
Light cast and stove plate	8.25 to 8.75

St. Louis

ST. LOUIS, MO., August 18, 1913.

With the needs of large consumers fairly well taken care of and most of the small ones comfortable as to stocks in hand and under specifications, there has been a cessation in new demand, though the aggregate of orders is by no means negligible. Some of the recent crop reports do not seem to have affected the present situation.

Pig Iron.—With the one noteworthy exception the market has progressed along normal lines, the buying being for the most part confined to relatively small orders in Southern iron, for which the quotation at this point is stiffly held at $11 to $11.50, with no disposition to shade below the low figure. Most of the inquiries have been promptly filled. Aside from the Southern foundry iron, there was an inquiry for 500 tons of high manganese, one for 100 tons of No. 1 soft Southern, and a sale of a like amount of the last named. The special feature referred to was activity in Lake Superior charcoal iron for which contracts were closed in the week totalling in excess of 10,000 tons, divided into 1000 ton, 2000 ton and smaller lots. There has also been an increased activity in Virginia iron and a number of small lots have been sold. Late sales of Southern iron included quite a number of additional lots running in the 5-ton to the 200-ton class, all being for delivery through the current year. In the aggregate these amounted to a considerable quantity and all the furnace representatives shared in the demand for the iron. There also appeared late a number of inquiries for deliveries extending into the coming year, but so far as reported all these were met with a refusal from furnaces to quote for such delivery.

Coke.—Prices have stiffened materially and representatives of the ovens assert that no Connellsville coke, 72-hr. best selected, is to be had below $3.25, with a number of the best brands entirely withdrawn. Virginia coke, 72-hr., is to be had for $3 and by-product on the Connellsville basis. Sales, for the most part, have been in small lots, but a number of contracts have been finally closed for the full year by consumers whose requirements are pretty definitely known, but which have not been specified as to actual totals. Furnace coke is not moving and the smelters affected by the lead strike in southeast Missouri being the chief consumers in this territory, there is no immediate prospect of new large transactions.

Finished Iron and Steel.—New business in finished materials has been only fair, continuing to run about two-thirds of the shipments. In standard steel rails no business at all appeared, while in light rails the actual sales were somewhat lighter than for some weeks. However, a late inquiry was for about 10 miles and will be closed the current week. In structural material there has been some slowing up, though the fabricating shops report considerable work ahead. In bars, both ordinary and reinforcing steel, there is sharp demand for material under contract.

Old Material.—The scrap market, aided by the strength shown in pig iron, has maintained its position and dealers continue to feel optimistic. They have also marked up their prices quite generally. The demand for the moment is chiefly for the foundry grades, the rolling mills not having come into the market to any extent for additional material. However, the rolling mills have lifted their embargos quite generally and practically none is asking for more than ten days delay in the delivery of material contracted for. Relaying rails are harder than ever to get and dealers have practically been compelled to stop trying to fill orders because of the absence of supply. Lists out during the week included one of 100 tons from the New Orleans & Northeastern and one of 1700 tons from the Chicago & Eastern Illinois. We quote dealers' prices f.o.b. St. Louis, as follows:

Per Gross Ton.

Old iron rails	$12.00 to $12.50
Old steel rails, re-rolling	12.00 to 12.50
Old steel rails, less than 3 ft	10.75 to 11.25
Relaying rails, standard section, subject to inspection	23.50 to 24.50
Old carwheels	11.50 to 12.00
Heavy melting steel scrap	10.50 to 11.00
Shoveling steel	10.00 to 10.50
Frogs, switches and guards cut apart	10.50 to 11.00

Per Net Ton.

Iron fish plates	$11.50 to $12.00
Iron car axles	19.25 to 19.75
Steel car axles	15.50 to 16.00
Wrought arch bars and transoms	13.50 to 14.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	9.75 to 10.25
Railroad springs	8.50 to 9.00
Steel couplers and knuckles	8.50 to 9.00
Locomotive tires, smooth	11.00 to 11.50
No. 1 dealers' forge	7.00 to 7.50
Mixed borings	4.00 to 4.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers, cut to sheets and rings	6.00 to 6.50
No. 1 cast scrap	9.00 to 9.50
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	7.50 to 8.00
Pipes and flues	7.00 to 7.50
Railroad sheet and tank scrap	6.00 to 6.50
Railroad grate bars	7.25 to 7.75
Machine shop turnings	5.75 to 6.25
Bundled sheet scrap	5.00 to 5.50

San Francisco

SAN FRANCISCO, August 12, 1913.

A weaker feeling has developed rather suddenly in the local steel market. For no very evident reason, resale prices on bars, plates and sheets have been marked down. Jobbing trade in most lines continues fairly active, and a few large consumers are getting into the market, but buying by merchants is still restricted. Financing of important development projects progresses but slowly, and few orders of any consequence are coming from such sources, though improvement in this line is expected in the near future. More activity in distributive lines is expected next month, and the high prices realized on California crops offer some encouragement as to fall business.

Bars.—The bar market is rather unsettled in view of the imminent tariff changes, which will doubtless bring considerable competition in Pacific coast territory. Foreign bars can now be laid down here at 1.75c., and a price of about 1.55c. is expected under the new tariff. The leading Eastern interests are preparing to meet competition, and the outlook for local manufacturers is rather disquieting. Nearby requirements are fairly well covered, as a considerable tonnage of foreign material, purchased at about 1.70c.

lown, is arriving on old orders for various mers and manufacturers throughout this district, e is accordingly no buying of any consequence. here is a general tendency to rely upon the stock e United States Steel Products Company, which ing largely increased, to cover any shortage that develop. Local manufacturers of reinforcing bars rt a little stronger market, with a satisfactory agate of small orders, though no notable inquiries appeared. Soft steel bars, in small lots from are 0.15c. lower, being quoted at 2.60c., with iron 50c.

tructural Material.—Building operations have been what curtailed, many projects being held up initely for lack of funds, though there is conable small work on apartment houses, and ocnal inquiries are received from country towns. l fabricators report few jobs being figured, and while important contracts are expected shortly there tle definitely in view for the future. The United s Steel Products Company has taken the Fine Building at the exposition, and submitted the st bid on the entrance tower, but the award on latter is indefinitely withheld. The Western Iron ks has a small job on the Stewart Hotel annex, Dyer Bros. have a building at Modesto, Cal. The tract for the 13-story Mason Estate building at Angeles has been let to the Baker Iron Works. s are out for the Hobart building in this city. the Spreckels building planned for Fourth and ket streets is held up. Figures are being taken the Y. W. C. A. building, Oakland, requiring about tons.

Rails.—No large orders have been booked of late. small business is not abundant. Several prospec buyers appear to be taking an interest in the ket, but there is no assurance that any business result. Light rails receive little attention, and sup s on hand are diminishing but slowly.

Sheets.—While the consuming demand continues derately active, jobbing prices have dropped, the ine on galvanized amounting to 0.10c. and on blue aled to 0.25c. Few merchants have any large k on hand, and specifications are coming out a e better than for the latter part of July, though movement is still light.

Plates.—The current movement of tank steel keeps t about the former rate, and some new inquiries are ing out which may require considerable tonnage. the present, however, both merchants and manuturers are limiting their purchases to actual rements. Shipbuilding work is more in evidence n for a month or two. Resale prices on tank steel e been reduced 0.15c.

Merchant Pipe.—Business is quiet in all lines. re is some demand for lap-weld, but this is not a tor of great importance at present, and mill agents receiving hardly any business in the butt-weld s. Notice has just been received of the expected p in prices on butt-weld pipe amounting to $2 ton. Jobbing business, which until recently was te active, has fallen off somewhat, but stocks in st quarters are now moderate, and will soon need re or less replenishing.

Cast Iron Pipe.—A few outside towns are taking res on small quantities, but on the whole business ains dull, the total tonnage being comparatively t. Corporation buying is greatly restricted. merous municipalities have issued bonds for waterks improvements, but the money is not readily ainable.

Pig Iron.—The local market so far shows no reflecn of the stronger feeling elsewhere, though conerable buying is expected from the larger melters fore long. Most foundries, however, are buying y in a hand-to-mouth way, and actual consuming uirements are by no means heavy. No. 1 Southern t iron is quoted here at $22 to $22.50 per gross ton.

Coke.—More strength is noted as to values, and a rly large tonnage of German Syndicate coke has n taken for fall shipment. Little is offered now r fall loading at less than $12.50 per gross ton, and st of the coke in transit is said to have been sold. ices for prompt delivery, ex-yard, stand as before $15 to $15.50 per net ton.

Old Material.—Few large purchases are being sed, the tendency being rather to buy for immediate eds only, but most lines of scrap are moving off rly well in small lots. Prices are steadily held at e old level, as follows: Cast iron scrap, per net n, $17.50 to $18; steel melting scrap, per gross ton, $12; wrought scrap, per net ton, $13 to $15; rerolling rails, per net ton, $16 to $17.

The Crane Company has let contracts for an additional two-story warehouse, 80 by 100 ft., near Second and Brannan streets, San Francisco.

America Looking for British Steel

American Buyers Anticipating Lower Duties —Firmer Tendency in British Markets

(By Cable)

LONDON, ENGLAND, August 20, 1913.

America is inquiring for semi-finished steel and also finished material in connection with the expected tariff reductions. Low offers have been made, but no business has resulted. The tendency of sellers is firm. Pig iron is dull, but firm, and the general inclination is to look for some advance. The new direct process for making steel from ore, with gas as the reducing agent, referred to in the cable dispatch of March 25, was that of a company registered this week with a capital of £2,000,000, under the name of Simpson & Oviatt British Iron & Steel Corporation. The demand for tin plates is a little better, with fair inquiries from Japan and Mexico. Stocks of pig iron in Connal's stores are now 187,298 gross tons against 192,230 tons a week ago. We quote as follows:

Cleveland pig-iron warrants (Tuesday), 54s. 10d. ($13.34), against 54s. 11d. ($13.36) a week ago.

No. 3 Cleveland pig-iron, makers' price f.o.b. Middlesbrough, 56s. ($13.64), against 55s. 9d. ($13.56) a week ago.

Ferromanganese, £10 11s. 9d. ($51.53), f.o.b. shipping port.

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. ($23.11).

German sheet bars, f.o.b. Antwerp, 87s. 6d. ($21.29).

German 2-in. billets, f.o.b. Antwerp, 80s. ($19.46).

German basic steel bars, f.o.b. Antwerp, £4 15s. ($23.12) to £4 16s. ($23.36).

Steel bars, export f.o.b. Clyde, £6 12s. 6d. ($32.24).

Steel joists, 15-in., export f.o.b. Hull or Grimsby, £6 5s. ($30.42), against £6 7s. 6d. ($31.02) a week ago.

German joists, f.o.b. Antwerp, £5 8s. to £5 11s. ($26.28 to $27.01).

Steel ship plates, Scotch, delivered local yards, £7 15s. ($37.72).

Steel black sheets, No. 28, export f.o.b. Liverpool, £9 5s. ($45.02).

Steel rails, export f.o.b. works port, £6 12s. 6d. ($32.24).

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s. 1½d. ($3.19).

(By Mail)

Pig Iron Market Quiet But Hopeful—Semi-Finished Steel Higher After Sharp Cuts

LONDON, August 9, 1913.

There is a quiet tone about the British iron and steel markets, but the feeling is rather more hopeful, assisted by the improved monetary and political outlook. The holidays naturally militate against the placing of new orders for the time being, but there is believed to be a considerable amount of work to be released as soon as the vacations are out of the way. The excitement regarding the Cleveland iron masters' proposals for the destruction of the warrant iron market has subsided with the postponement of action by the committee appointed, but the hint conveyed in earlier letters to you on the subject, that there was strong internal opposition to the proposals, has been amply confirmed. The hostility comes mainly from Sir Hugh Bell and the interests allied with his business, that of Bell Brothers, Ltd., but outside this, of course, there is the energetic opposition of the merchant and distributing trades to be reckoned with. It is a very curious thing how and why the scheme for wrecking the warrant market should have developed just now, for the failure of the firm of James Watson & Co. hit other people quite as much as it did the pig iron producers. Even now the Cleveland iron masters, some of them at all events, while openly denouncing the iniquities of the warrant market, have actually been using it for selling their output. The

chances now are very much in favor of the scheme being rejected, so far as its more drastic proposals are concerned, some of the makers beginning to think that to kill the warrant market would be very like killing the goose that laid the golden eggs.

Not very much fresh interest has been taken in pig iron, mainly because of the holidays. The tendency of prices is steady all round, led by the Cleveland market, where bears are afraid to operate. Brokers have refused to execute orders on the short side of the market, fearing lest clients might be absolutely cornered; and to this extent the Cleveland iron masters have been wise in their generation, for the mere discussion of their proposals has prevented a bear raid which would have been quite an easy thing to engineer.

The position of half-finished steel is decidedly stronger as regards sheet bars, and indeed prices of blooms and billets are a little firmer, but the advance in these is small compared with that in sheet bars. The French, who have been cutting prices to rags in order to get hold of orders, have now taken sufficient to provide employment for a little time. It is estimated that they have sold 100,000 tons of sheet bars and are now out of the market, while the Belgians will not accept orders. This throws the demand on the Germans, who have lifted their price to 87s. 6d. ($21.39) f.o.b. Antwerp, but have so far not sold at it. It would almost seem that the bulk of the buying has now been done for the fourth quarter, though there are sanguine spirits who opine that a good deal has yet to be booked. Finished Continental material has stiffened moderately, but the market is very much affected by the enormous growth of output and by the failure of the negotiations among the Germans to bring about a convention for the bar trade. A week or two ago one of the largest German works was selling basic steel bars at £4 10s. ($21.90) f.o.b. Antwerp, a ruinous figure, and even today there are plants whose position as regards new orders is described as "desperate." Consumption is keeping up very well, and the weakness which has been seen arises from the excessive capacity of the new plant brought into operation within recent months.

The average net selling price of finished iron in the North of England in May and June, which has just been returned, is £7 11s. 3.07d. ($36.83) a ton, which constitute a record for the trade. The highest price of 1907, which has always been regarded as the banner year was £7 6s. 0d. ($35.71). The finished iron market is quiet now and prices have a weak tendency following the reduction of 10s. ($2.43) in marked bars a few days ago.

The steel trade remains much as before except that prices are in some directions being openly cut for the home trade, whereas hitherto they have been kept ostensibly unchanged. A few more shipbuilding contracts have been let, but more work is wanted generally for the rolling mills.

Boston

BOSTON, MASS., August 19, 1913.

Old Material.—The feeling is much better. In some instances markets that have been closed of late have been reopened. The optimism of the brokers makes it apparent that they believe the low point of the market has been reached and that any movement will be upward. No appreciable change in prices is noted, however. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.25 to $8.50
Low phosphorus steel	13.50 to 14.50
Old steel axles	13.50 to 14.00
Old iron axles	21.00 to 21.50
Mixed shafting	13.00 to 13.25
No. 1 wrought and soft steel	10.25 to 10.50
Skeleton (bundled)	6.75 to 7.00
Wrought-iron pipe	8.00 to 8.25
Cotton ties (bundled)	7.75 to 8.00
No. 2 light	3.50 to 4.00
Wrought turnings	4.75 to 5.00
Cast borings	4.75 to 5.00
Machinery, cast	11.50 to 12.00
Malleable	10.00 to 10.50
Stove plate	7.50 to 7.75
Grate bars	6.00 to 6.25
[illegible]	[illegible]

Lower German Prices Induce Buyi

Steel Bars More Active—Pig-Iron Production Continues to Increase

BERLIN, August 7, 1913.

Price reductions in bars and plates have been f lowed by a fairly active business in the last few d For the near future, however, no marked change for better is expected, with the possible exception o strengthening of bars. In fact, today (Thursd brought one report of sales at two marks above ruling prices.

Some plate works are already making deliveries ahead of the specified time for the want of new bu ness. Prices of thin plates are 124 to 126 marks ($29 to $29.99). Heavy plates are now quoted at 114 ma ($27.13) net and 116 marks ($27.61) with 1½ per ce discount, f.o.b. Essen. There has been a slight increa in specifications for plates in the last two or three da

Persistent efforts are apparently still being made hold up the price of wrought pipe and boiler tubes b in fact, considerable rebates are being granted, acco ing to the amount of the purchase. Band-iron pri have dropped, despite a hard fight to maintain form levels. Several important works quote 128½ ma ($30.58) for any quantity. There are indications, ho ever, that improvement has set in. Tuesday's meeti at Cologne of the Association of Rhenish-Westphal Band-Iron Works received reports that an improvem abroad of the bar-iron market had favorably affect the band-iron situation in Germany, and that domes requirements are large, with insufficient supplies.

Pig-Iron Production Still Increasing

Pig-iron production in Germany and Luxemburg f the month of July reached 1,646,882 metric tons, whi compares with 1,608,305 tons in June and 1,505,360 to in July, 1912. The production was divided as follow compared with July, 1912:

	1913 Tons	1912 Tons
Bessemer	35,364	33,905
Thomas	1,031,192	952,579
Ferromanganese and spiegel	217,936	186,939
Puddling	39,155	41,205
Foundry	323,235	290,732

The production for the first seven months of th year was 11,214,548 tons, against 10,070,348 tons for th corresponding period of 1912. The domestic productio of pig iron has tended steadily upward since Januar the only noteworthy halt being in February, and th figures for each month have exceeded all previou records.

Steel Syndicate's Shipments Falling Off

The Steel Works Union's report of the July ship ments of rails, structural shapes and semi-finished ste shows a considerable falling off from June. The Ju figures are 570,000 tons, which compares with 605,57 tons in the preceding month. The July shipments o the Wire Rod Association showed a slight increas being 35,750 tons, against 34,250 tons for the preceding month. The association decided to maintain for th fourth quarter the base price of 122.50 marks ($26.78 established some weeks ago. The market is reported quiet. The association accepted the Kraft works as a member. This is an important Lower Rhine mill.

The Steel Works Union will be asked next month to grant a further quota to the Associated Rolling Mill of Burbach-Eich-Düdelingen at Esch. This company's new mill for railroad structural material will be started in September. The demand will be for a further 20,00 tons in each product.

The Belgian Market Firmer

Better reports come from the Belgian market, which has experienced an unmistakably firmer tendency in the last days. Iron bars have especially improved. Large inquiries for extended deliveries in the first half of 1914 are coming in from East India, Japan and Australia, but at prices that offer no incentive to fill them. The bar-iron trade had been holding back to see whether the proposed bar association in Germany would be formed, in which case it was feared there would be a dumping of surplus products in Belgium. The association was not formed, however, and consumers find themselves compelled to cover their needs in their own market at ruling prices. The pig-iron situation remains uncertain, with puddling iron at 68.50 to 70 francs ($13.22 to $13.51), Thomas iron 70 to 72 francs ($13.51 to $13.90), foundry 77 to 79 francs ($14.86 to $15.25).

espite the conditions of the last few months, vari- companies reporting this week show good profits increased dividends. The Annen Cast Steel Works red a dividend of 9 per cent., against 6 last year; Rolands Blast Furnaces of Weidenau, 7 per cent., st a passed dividend last year, and the Saxon Cast Factory in Döhlen declared 20 per cent., as last and wrote off some $125,000 more than in 1912.

Buffalo

BUFFALO, N. Y., August 19, 1913.

ig Iron.—Prices remain the same as quoted a week and the sales for the week reached fully 20,000 making a total of over 70,000 tons so far this th. While the market is quieter and inquiries are ed, the furnace interests report that the indica- on and below the surface of the trading are all uraging. The business of the week was in foun- grades and malleable iron to scattered consumers g for immediate and nearby requirements, show- hat the iron is going into early consumption. It ported that most of the foundries are operating scant stocks in their yards and that if the expected mpetus is added to the amount of buying that has done the tendency will be to further strengthen market. We quote the following prices, f.o.b. Buf- over the remainder of the year:

No. 1 foundry	$14.00 to $14.50
No. 2 X foundry	14.00 to 14.25
No. 2 plain	13.75 to 14.00
No. 3 foundry	13.75
Gray forge	13.75
Basic	14.00 to 14.50
Malleable	14.00 to 14.50
Charcoal (regular brands)	15.75 to 16.75
Charcoal (special brands)	16.50 to 17.50

Finished Material.—Price cutting in the Middle t has not influenced the attitude of the leading s and agencies of this district. They all report that volume of buying and inquiry has shown an im- ement. From seven to twenty inquiries a day in offices have taken the place of three or four a day, amount received in previous weeks of the past th. The smaller mills are able to make better de- ies, but no improvement is noted by the larger ucers. No cancellations are being reported in any he lines. Specifications on pipe continue good. petition among the fabricators here has reached a y stage. Shading in prices has been indulged in some of them, despite the fact that the base on tural remains the same as it has for a long period 45c. Some of the plants here are so busy and ked so well ahead that they have not entered into competition. C. F. Ernst's Sons Company, Buffalo, red a 100-ton contract for the Lumen Bearing pany's foundry addition. Bids are to be taken this k on the S. S. Kresge Company's new building. roit, Mich., requiring about 2000 tons. Bids will aken soon for the new church, school, rectory and vent of the Sacred Heart Catholic Church, Buffalo, iring about 200 tons. The New York Telephone pany is to take bids on a new telephone exchange Niagara Falls, N. Y., requiring about 150 tons.

Old Material.—With the exception of heavy melting l, there was more trading in all lines the past week. principal movement was in clean cast borings, the ers coming from the Pittsburgh section. The lead- interest is still out of the market on heavy melting l. The dealers have not altered prices from the ge quoted a week ago, but consider them a little er and look for a rise in keeping with the advance e in pig iron. There has been no disposition on part of the yards to invite buying by cutting sched- . The schedule for the week, f.o.b. Buffalo, per s ton, is as follows:

Heavy melting steel	$11.00 to $11.50
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Low phosphorus steel scrap	16.50 to 17.00
Iron rails	15.00 to 15.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 railroad and machinery cast scrap	13.00 to 13.50
Steel axles	17.00 to 17.50
Iron axles	22.50 to 23.00
Carwheels	13.00 to 13.50
Railroad malleable	12.00 to 12.50
Locomotive grate bars	10.00 to 10.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	9.50 to 10.00
Wrought iron and soft steel turnings	6.00 to 6.50
Clean cut borings	6.25 to 6.75
Bundled tin scrap	14.00

New York

NEW YORK, August 20, 1913.

Pig Iron.—The amount of 100-ton to 300-ton business that has been going on their books is quite satisfactory to producers and there are occasional orders for 1000 tons or more. In the case of some of certain large buyers, who did not cover for all of their requirements for 1913, the effort has been in the past week or ten days to see how close some furnace would come to the low prices made in the heavier July movement. While on early delivery business it is possible here and there to come within 25 cents of the bottom it is more usual to find that low bidders on inquiries now going out are about 50 cents above the July low point. A recent inquiry is for 5500 tons for the Eastern works of a large harvester interest, and a Connecticut foundry is inquiring for 2000 tons of high silicon irons for early delivery. The outcome of negotiations by a western New York melter for 5000 tons of basic and 5000 tons of malleable iron is not reported. The malleable iron was wanted for comparatively early delivery. Ratner close competition by Buffalo furnaces is indicated. On the 5500-ton inquiry the competition was between Buffalo and western Pennsylvania furnaces outside of the Shenango Valley. Virginia prices are somewhat firmer. The leading producer is now naming $13.25 at furnace for No. 2 X foundry iron, nominating silicon at 2.25 to 2.75 per cent. rather than 2.50 to 3 per cent. The same producer is now quoting No. 2 plain at $13 as against $12.75 one week ago. One Virginia furnace has gone out this week and another is likely to do so shortly. In eastern Pennsylvania the tendency is toward less rather than greater output. On Eastern business Buffalo furnaces are generally quoting $14 at furnace for No. 2 X. As a rule transactions are not of a size to bring out concessions from this figure. The belief that the bottom was touched in July has apparently facilitated the doing of business at a greater or less advance from that low level. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $15.75 to $16; No. 2 X, $15.50 to $15.75; No. 2 plain, $15.25 to $15.50. Southern iron is quoted at $15.50 to $16 for No. 1 foundry and $15 to $15.50 for No. 2.

Structural Material.—A decided dullness in new demand with expected softness in price describes the present condition in this center. There have been some lettings but the amount involved has not been equalled by new inquiries. At least one quotation at 1.40c. Pittsburgh has been made for a round tonnage, and one instance is known of less than 1.40c. Pittsburgh, being turned down by the buyer, probably because of hesitancy to rely on the promised delivery date. The volume of railroad inquiries has not kept up to that observed in the preceding week and new building work in New York is practically at a standstill, with some of the fabricators urgently in need of work and facing a renewal of the pledge of large insurance companies not to finance building work before spring. Ten bids were received for the New York subway work known as section 1, routes 36 and 37, and the lowest was submitted by Snare & Triest. Late structural awards include 620 tons for an apartment on 150th street and 800 tons for the Princeton apartment house on Eighty-seventh street, both given to Ravitch Brothers; 1100 tons for an apartment house at Seventy-seventh street and Park avenue to the Hinkle Iron Company; 400 to 500 tons for seven tower derricks equipped with Lidgerwood electric hoists for the Harlan & Hollingsworth Corporation, Wilmington, Del., to the Terry & Tench Company, New York, the first derrick to be delivered in 12 weeks and the others at 2-week intervals; 300 tons for eight bridges for the New Haven to Lewis F. Shoemaker & Co.; 300 tons for a piershed at Baltimore for the Pennsylvania Railroad to the American Bridge Company. The New Jersey Zinc Company is inquiring for the bridge at its Palmerton works, involving 1100 to 1200 tons. The Edendale Construction Company is in the market with an apartment house requiring 600 tons and the George A. Fuller Company is reported to have the contract for the Royal Bank at Toronto, requiring upward of 2500 tons. We quote plain material, mill shipments, at 1.45c., Pittsburgh, or 1.61c., New York, except for attractive offerings on which 1.40c., Pittsburgh, is obtainable. Prices for store are 2.10c. to 2.15c.

Plates.—The Lehigh Coal & Navigation Company is inquiring for barges, requesting prices on one delivered by November, or 20 delivered in April, 1914. What little new business is materializing is done at 1.45c. to 1.50c., Pittsburgh, but large offerings could apparently

be closed at a basis of 1.40c., Pittsburgh. This fact is indicated in part by the practically immediate shipments which the mills are making on miscellaneous orders, by the failure of two plate rolling mills to get any of the recent business of a large boiler manufacturing plant at 1.45c, Pittsburgh, although the buyer is regularly taking plates, and by the rumor that a shipbuilding interest has bought 3000 tons at a 1.40c. Pittsburgh basis. We quote plates at 1.56c. to 1.66c., New York, depending on the size of the order and the urgency for shipment.

Bars.—Both iron and steel mills rolling bars report a fair volume of specifications against contracts, but not much new business. One bar iron mill sent to the rolling department orders equalling the capacity of the mill for the week. We quote mill shipments of steel bars at 1.56c., New York, and shipments from store at 2c. to 2.05c., and bar iron, mill shipments, at 1.40c. to 1.45c., New York, and from store 2.05c. to 2.10c.

Ferroalloys.—For 80 per cent. ferromanganese, $56. Baltimore, continues to be quoted and sales have been made at that figure by New York agencies where competition was a factor. At the same time reports are heard and generally accepted that prompt delivery material has sold at $55, Baltimore. The situation is one which has occurred several times in the past few months and latterly has excited comment. Immediately after a reduction has been announced by representatives of English makers, there comes to light a further cut, usually credited to merchant dealers, and the market takes on the appearance of unstability. At present inquiry is light. The usual steady demand exists for 50 per cent. ferrosilicon, which is quoted at $75, Pittsburgh, for carloads, $74 for 100 tons, and $73 for 600 tons and over.

Cast-Iron Pipe.—The sewer and water division of the public works department of Boston, Mass., is about to advertise for bids for 5650 tons of 6 to 30-in. pipe and 400 tons of specials. No other public letting of importance is in sight. Private buying has shown more activity, quite a tonnage having been placed in this way in the past week. Prices of carload lots of 6 in. are $23 to $24 per net ton, tidewater, New York.

Old Material.—Although consumers still refrain from manifesting much interest in the scrap market, more cheerful views are expressed among dealers, the belief growing that a buying movement is near at hand. Prices are firm but unchanged. Dealers' quotations are as follows, per gross ton, New York:

Old girder and T rails for melting	$9.00 to	$9.50
Heavy melting steel scrap	9.00 to	9.50
Relaying rails	21.50 to	22.00
Rerolling rails	12.50 to	13.00
Iron car axles	21.00 to	21.50
Steel car axles	14.50 to	15.00
No. 1 railroad wrought	11.75 to	12.25
Wrought-iron track scrap	11.00 to	11.50
No. 1 yard wrought, long	10.50 to	11.00
No. 1 yard wrought, short	10.00 to	10.50
Light iron	4.50 to	5.00
Cast borings	5.25 to	5.75
Wrought turnings	4.50 to	5.00
Wrought pipe	8.75 to	9.25
Carwheels	12.50 to	13.00
No. 1 heavy cast, broken up	10.75 to	11.25
Stove plate	8.00 to	8.50
Locomotive grate bars	7.50 to	8.00
Malleable cast	9.00 to	9.50

Metal Market

NEW YORK, August 20, 1913.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York.			Lead		Spelter	
		Electro-	Tin,	New	St.	New	St.
Aug.	Lake.	lytic.	New York.	York.	Louis.	York.	Louis.
14	16.00	15.75	41.80	4.50	4.42½	5.70	5.55
15	16.00	15.75	41.40	4.75	4.65	5.75	5.60
16	16.00	15.75	41.50	4.75	4.65	5.75	5.60
18	16.00	15.75	41.45	4.75	4.67½	5.80	5.65
19	16.00	15.75	41.30	4.75	4.67½	5.85	5.70
20	16.00	15.75	41.25	4.75	4.67½	5.85	5.70

Copper buying has slackened, but quotations are unchanged. Tin is quiet and price variations have been slight. Lead is higher and the demand is good, but large quantities are not easy to obtain. The demand for spelter is not especially heavy, but prices have advanced because of various influences. Antimony is without change.

New York

Copper.—Since Wednesday last there has been a pronounced falling off in the heavy sales which had been going on day by day. The advance in price announced on that day served as a check to activity, although the cessation of buying was rather to be expected in view of the fact that both American & European consumers were well filled up. At least large agency is to-day quoting 15.75c. cash, New Y for electrolytic for prompt delivery, while other s cies are asking 15.87½c. cash, New York. The le activity of the last few days has caused some se mental weakness, though as far as prices go the m ket is still firm. Lake, quoted at 16c., is practic nominal, though a little could probably be found that price. The miners' strike in the Lake distric going a long way to support the market in both L and electrolytic. The price in London to-day was 17s. 6d. for both Lake and electrolytic. The exp this month totaled 22,008 tons.

Pig Tin.—The market has been quiet, with pr unusually uniform for this metal. Consumers pretty well supplied, and their attitude is one of w ing for something to happen to make entrance into market worth while. The Minnewaska is now in p with 1150 tons of tin, but despite this large arrival not expected that there will be any large supply hand during the remainder of August, inasmuch most of this cargo will be used to care for old c tracts. It is even expected that the market may b little tight in the next ten days, but this continge is not regarded seriously in view of the fact that much business is looked for this month, and also cause speculation has ceased for the time being. is quoted in New York to-day at 41.25c. The price London is £187 5s. for spot and £186 for futu The arrivals this month totaled 2633 tons, and ther afloat 1730 tons.

Lead.—There was an excellent demand for lead week, and it still may be called good. The min strike in Missouri has had a serious effect on the tra many of the refineries being closed, and the operat companies withdrawing from the market. When strike was declared last Friday the American Spelt & Refining Company withdrew from the market fo short time, then announced that it would sell at 4.7 New York, an advance of 25 points over the quotat of the day before. It is not believed that at this fig any large quantity can be purchased, nor is it lik that the large interest would undertake to contract September or October shipments at this time. T New York quotation to-day is 4.75c., and that at Louis 4.67½c., though the latter figure is practica nominal. The trade looks for a bitter and long dra out fight between the miners and the companies, a it is expected that prices will climb until peace declared.

Spelter.—Responding to a somewhat better dem in the last few weeks, prices have advanced to 5.8 New York, and 5.70c. St. Louis. Strike troubles in West and higher prices of ore have helped, of cou to accelerate the advances. In the latter part of l week there was fairly heavy buying of high-grade m by the brass mills, but the lower grades, such as used by galvanizers, were not especially active. T lower prices of the first half of this year are explain by the mid-year statistics of the Government, wh show that producers' stocks had increased from 4 tons on January 1 to 21,856 tons on July 1, while c sumption had dropped from 181,326 tons in the h half of 1912 to 153,073 tons in the first half of 19 Production in the first half of 1913 increased slig

Antimony.—The market is a trifle firmer, altho business is still wanting. Prices have the same ra at 7.75c. to 8c. for Hallett's; 8.35c. to 8.40c. for Coo son's and about 7.50c. for Chinese and Hungari grades. Practically all sales of futures are of me in bond. As heretofore pointed out, there is som thing like 4,000,000 lb. of antimony in bonded wa houses, and those who buy for future delivery exp the advantage of a lower tariff rate.

Old Metals.—Dealers have advanced their sell prices and now quote as follows:

	Cents per lb.
Copper, heavy and crucible	15.00 to 15.50
Copper, heavy and wire	14.50 to 15.00
Copper, light and bottoms	13.50 to 13.75
Brass, heavy	9.75 to 10.00
Brass, light	8.25 to 8.50
Heavy machine composition	13.25 to 13.50
Clean brass turnings	8.75 to 9.00
Composition turnings	12.00 to 12.50
Lead, heavy	4.50
Lead, tea	4.25
Zinc, scrap	4.50

Chicago

AUGUST 18.—Orders for copper are of a satisfacto volume, and continued inquiries for quantities are gi ing additional strength to the market. Many co sumers are postponing purchases, but selling interes

re optimistic. Slightly advanced prices are quoted in both casting copper and Lake. Pig tin, lead, spelter and zinc are also higher. We quote as follows: Casting copper, 16c.; Lake, 16.25c. in carloads for prompt shipment; small lots, ¼c., to ⅜c. higher; pig tin, carloads, 42c.; small lots, 44c.; lead, desilverized, 4.70c. to 4.75c.; corroding, 4.95c. to 5c., for 50-ton lots; in carloads 2½c. per 100 lb., higher; spelter, 5.85c.; Cookson's antimony, 10.50c. and other grades 9.75c., in small lots; sheet zinc, $7.75, f.o.b. LaSalle or Peru, Ill., less 8 per cent. discount in carloads of 500 lb. casks. Old metals are quiet, with a slightly higher market on copper. We quote buying prices for less than carload lots: Copper wire, crucible shapes, 13c.; copper bottoms, 12c.; copper clips, 12.75c.; red brass, 12c.; yellow brass, 8.50c.; lead pipe, 3.75c.; zinc, 5c.; pewter, No. 1, 26c.; tinfoil, 31c.; block tin pipe, 36c.

St. Louis

AUGUST 18.—Prices have continued to move upward. In addition to the improved demand there has been the effect of the lead miners' strike in southeastern Missouri to strengthen the views of those with metal on hand. Lead closed to-day at 4.75c. Spelter moved up sharply, with considerable sales at each advance and the demand apparently unabated, closing to-day strong at 5.75c. Tin is quoted at 41.62½c. to 41.97½c.; Lake copper, 16.35c.; electrolytic copper, 16.15c. to 16.25c.; Cookson's antimony, 8.75c. to 8.85c. In the Joplin ore market there was especially spirited competion for zinc blende, resulting in an advance of $2 to $3 per ton. Practically all purchases were for immediate delivery and on the basis of $46 to $48 for 60 per cent. The protracted drought, too, cutting off water supplies to the mines to a considerable extent, curtailed production of both lead and zinc. The highest settlements of the week ran $61 for the choicest ores. Calamine brought $22 to $23 for 40 per cent. and the choicest as high as $27. Lead ore was also much stronger, and the basis price for 80 per cent. was $55. On miscellaneous metals we quote as follows for scrap: Light brass, 6c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 11c.; zinc, 2.75c.; lead, 3c.; pewter, 21c.; tinfoil, 30c.; tea lead, 2.75c.

Iron and Industrial Stocks

NEW YORK, August 20, 1913.

The stock market has been unfavorably affected by the Mexican situation, the prospect of further Balkan troubles in Europe and, to some extent, by the disaster to the corn crop in important corn producing States. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.....	32¼- 35⅝	Pressed Steel, com..	24½- 25
Am. Can. pref.....	93¼- 94½	Pressed Steel, pref..	95 - 96
Am. Car & Fdy., com.	45 - 47⅜	Railway Spring, com.	26 - 26¼
Am. Car & Fdy., pref.	113⅜-115	Republic, com.....	23½- 25½
Am. Loco., com....	32 - 34¼	Republic, pref.....	87½- 89
Am. Loco., pref.....	101½	Rumely Co., com...	16½- 17
Am. Steel Foundries	30⅛- 31⅞	Rumely Co., pref...	39¾- 41
Bald. Loco., com...	45 - 45½	Sloss, com.....	29¾- 31
Bald. Loco., pref.....	105	Pipe, com.....	11¼- 12
Beth. Steel, com....	34½- 36½	Pipe, pref.....	49⅜
Beth. Steel, pref...	73⅜- 73¾	U. S. Steel, com...	61⅜- 66½
Colorado Fuel	31¼- 33	U. S. Steel, pref...	107½-109
Deere & Co., pref...	95 - 96½	Va. I. C. & Coke...	41 - 42½
General Electric ...	141½-145¼	Westinghouse Elec..	65⅛- 72¾
Gr. N. Ore Cert....	35½- 37¼	Am. Ship, com.....	40 - 41½
Int. Harv., com....	106 -108	Chic. Pneu. Tool...	51 - 51½
Int. Harv., pref....	114 -114¼	Cambria Steel	46 - 47⅜
Int. Harv., Corp...	105⅛-107	Lake Sup. Corp....	25⅛- 26½
Int. Pump, pref.....	28	Pa. Steel, pref.....	60 - 61
Lackawanna Steel	38	Crucible Steel, com.	15⅜- 15⅞
Nat. En. & St., com.....	14	Crucible Steel, pref.	93 - 93½
Pittsburgh Steel, pref.....	94½	La Belle Iron, com.....	47½

Dividends Declared

The General Electric Company, regular quarterly, 2 per cent., payable October 15.

Deere & Company, regular quarterly, 1¾ per cent. on the preferred stock, payable September 1.

The Republic Iron & Steel Company, regular quarterly, 1¾ per cent. on the preferred stock, payable October 1.

A new rust-proof coating for iron patterns is recommended by J. M. Compoton, Belfast, Ireland. It consists of 1 pint of turpentine, 1 gallon paraffine oil and sufficient powdered vegetable black to make it as thick as ordinary oil paint. It is applied evenly with a brush, but dirt and sand must be removed. The originator claims that he has some coated plate patterns which have been used 50 times and are still as smooth as glass. The vegetable black fills the pores of the iron.

Making Brick from Furnace Slag

Commercial Agent Frank G. Bolles contributes the following article to the Daily Consular and Trade Reports:

An extensive industry is being developed in the north of England, at Middlesbrough, based on the utilization of blast-furnace slag. Several companies are now engaged in the work and are apparently very successful, both as to results obtained from the brick as well as commercially. The method pursued in the manufacture of these bricks is as follows:

A suitable manufacturing site is selected near the blast furnaces which are to supply the slag, this plat being connected by an industrial railroad on which the molten slag is carried from the furnace to the molding machine. The latter consists of a metal wheel which may be of any suitable diameter, but which in the case examined was approximately 30 ft., this wheel being supported upon a vertical shaft. The spokes of the wheel are made of round rods and the construction of the wheel itself is quite similar to the wire-spoked wheel used for vehicles. The metal rim on which the molds are bolted is approximately ¾ in. thick and 6 in. wide. In the plant examined this wheel carried 120 molds 9 in. long, 3½ in. thick, and 4 in. deep, which is the standard size for paving brick. A variety of other molds are used, but the bulk of the work is of the paving-brick size.

The molds are made of two pieces, the front end or right side being an arm in one piece which is bolted to the rim of the wheel, while the left side, back end, and bottom is another piece. The latter is hinged to the part which is secured to the rim of the wheel and held for casting purposes by a catch on the front end of the stationary piece. On the right side of the mold is cast a lip which assists the operator in more readily striking the mold when pouring the hot slag. Before casting the molds are dusted with a powder, the appearance of which would indicate it to be Portland or other cement.

Molding and Annealing

The car which carries the slag is of plate steel with a firebrick lining, the top being covered with a removable cap, in the center of which is a hole approximately 18 in. in diameter, through which the slag is poured when the car is filled at the furnace. At the bottom of this car is a tap similar to those used on blast furnaces. The car of molten slag is run alongside the wheel, the trough to the tap extending over the molds; the clay plug in the tap is knocked out and the molten slag runs into the mold. As soon as it is filled an operator, by means of a handwheel mounted on a sheet-steel heat deflector and connected through rods and miter gears to the center of the molding wheel, turns the latter so that the next mold comes under the flow of hot slag, and so on until all the molds are filled. By the time that the wheel has made a quarter revolution the cast brick have sufficiently cooled so that they may be dropped out of the molds by knocking off the catch which holds the bottom in place.

As soon as the brick have dropped to the ground they are taken by laborers to the annealing furnaces, into which they are thrown in a promiscuous heap. These furnaces, of which there were six in the plant examined, held approximately 1100 brick at one charge. The heat retained in the brick when they are thrown into the furnace, together with a very small amount of fuel, again brings them to a cherry red, and as soon as the furnace has been filled it is closed and allowed to cool gradually, 24 hours usually being required before the bricks are removed.

The capacity of the slag car is approximately 3½ tons, from which 360 to 400 paving bricks are made. The bricks, when cleaned up, having all of the rough corners knocked off which have been left in the process of casting, weight 14 lb. each. These bricks are proving very efficient for street paving and are being exported to many countries.

The Ohio Seamless Tube Company, Shelby, Ohio, will make large additions and improvements to its plant, involving an expenditure of about $400,000. The capacity will be increased to about 1000 tons per month of seamless tubing. The additional capacity will be largely for supplying the motor car trade, and the company will open a warehouse in Detroit, Mich., carrying stock.

Personal

Charles L. Rogers, former president of the Sligo Furnace Company, St. Louis, sailed on the Mauretania this week for London, where he will have charge of the foreign business of the American Car & Foundry Company. James Buick succeeds Mr. Rogers as president of the Sligo Furnace Company and of the Sligo & Eastern Railroad Company.

R. Becker, president of Stahlwerk Becker, Willich bei Krefeld, Germany (the Becker Steel Company of America in this country), has sailed for the United States, which it is expected he will reach August 26.

Frank Williams, for a number of years superintendent at the South works, Worcester, Mass., of the American Steel & Wire Company, has been appointed superintendent of the entire works of the company at New Haven, Conn. He is succeeded at the South works by Edward Hentz.

William Smith, for some years master mechanic at the Eliza furnaces of the Jones & Laughlin Steel Company, Pittsburgh, has resigned to become general master mechanic of the Pennsylvania Steel Company, Steelton, Pa. He was presented with a diamond studded gold watch by the employees of the mechanical department from which he has just retired.

A. M. Powell, president Powell Machine Company, Fitchburg, Mass., is returning again to Europe on the Cunard Line, sailing August 19 on the Laconia, in the interest of the Powell Hy-Speed-Cut planer.

Charles E. Pope, president Impervious Sheet Steel Company, Pittsburgh, has sailed for Europe.

S. M. Keir, president Keir Fire Brick Company, Pittsburgh, has sailed for Europe.

H. E. Kelly, sales manager and treasurer of the Portage Silica Company, Youngstown, Ohio, has resigned to become assistant manager of the Falcon Bronze Company in the same city.

C. H. Sanderson, for a number of years one of the engineers on switchboard and power station design for the Westinghouse Electric & Mfg. Company at East Pittsburgh, Pa., has accepted the position of chief engineer for the Havana Electric Railway, Light & Power Company, at Havana, Cuba.

Charles H. Daker, for some years connected with the iron and steel trade in Pittsburgh, has engaged as salesman with Matthew Addy & Co., dealers in pig iron, steel, coke and ferroalloys, Farmers Bank Building, Pittsburgh.

John M. Sherrerd, who returned about three weeks ago from a trip through Germany with the American Society of Mechanical Engineers, has gone to eastern Texas to look over some deposits of brown iron ore being developed by Philadelphia parties.

P. O. Geier, treasurer Cincinnati Milling Machine Company, Cincinnati, Ohio, is enjoying a vacation in Wisconsin.

Charles H. Moyer, for 20 years New York manager and chief traveling representative of the George V. Cresson Company, Philadelphia, and in the past few months of its successor, the Cresson-Morris Company, has resigned his position. Mr. Moyer, who is widely known as a specialist in power transmission machinery, was connected with the George V. Cresson Company since boyhood and held various positions at the works before opening the New York office. He contemplates engaging in business as a special engineering representative and manufacturers' agent, with an office at 90 West street, New York.

Fred Holz, special representative in Vienna, Austria, for the Cincinnati Milling Machine Company, the Cincinnati Bickford Tool Company and the Lodge & Shipley Machine Tool Company, is now in the United States. He is identified with the Donauwerk, Ernst Krause & Co., Vienna, Prague and Budapest.

Thomas Spratt has been appointed assistant purchasing agent of the Norfolk & Western Railway Company, with office at Roanoke, Va.

The Thomas Iron Company has blown out its No. 11 furnace at Hellertown, Pa. Only two of its furnaces now remain active, one at Hokendauqua, and the Lock Ridge at Albertus, Pa.

The Moller & Schumann Salesmen's Convention

The Moller & Schumann Company, varnish maker Marcy and Flushing avenues, Brooklyn, N. Y., held its annual salesmen's convention August 12 to 14 inclusive, and has furnished an outline of the proceedings. This indicates the thoroughness with which the management endeavors to co-operate in keeping the salesmen posted on all new products of the factory and to educate them so that they can be of real service to their customers in advising as to the best materials to be used and the most economical processes of applying them. The important matter is not lost sight of that it is exceedingly desirable to foster and preserve the credit of the customer and still protect the interest of the company.

The outline furnished shows how practical is the instruction of the salesmen. Several closely spaced typewritten pages are necessary for the presentation of the topics in connection with varnishes, and their application. A very full analysis is given of the considerations governing the question of "How to Successfully Sell the Small Merchant with a Restricted Credit." Another matter on which practical suggestions were called out was "How to Successfully Sell a Merchant for Cash." Another topic for consideration was "Advertising and Office Co-operation." A most important matter brought out was "Why Should a Salesman Solicit Business That May Be Turned Down by the Credit Department?"

Book Reviews

Erection and Inspection of Iron and Steel Constructions. By L. M. Bernfeld. Pages 225, 6¼ x 9¼ in.; cloth. Published by the Chief Publishing Company, New York. Price $2.

The object of the author is stated to be to present some essential technical facts to practical builders; to make a ready reference book for architects, engineers and inspectors; and to aid engineering students and candidates for civil service positions as inspectors. He has succeeded to a considerable extent; but in essaying to give definitions of the terms of iron and steel manufacture he has gone beyond the field with which he is familiar, and the results are at times crude and misleading. The detailed descriptions of methods of inspection, the extracts from building codes and the tables for field computations are valuable and are well selected.

Poor's Manual of Industrials for 1913. Pages 2268, 5¾ x 8¾ in. Published by Poor's Railroad Manual Company, New York. Price $7.50.

This is the fourth annual number of this manual, which is devoted entirely to manufacturing, mining and miscellaneous corporations in which the public is interested. With its issue Poor's Manual for 1913 in three volumes is now complete. The well-known Poor's Manual, which is the standard authority on railroads, is now in its 46th year. There are also the Manual of Industrials and Poor's Manual of Public Utilities, both more recent publications. The three together contain over 6000 pages. In the present issue of the Manual of Industrials are about 900 new companies not listed in other publications. There are also numerous comparative and analytical tables which are a special feature of this volume. An appendix is given containing the most recent information about the railroads and public utilities. The corporation statements given in the Manual of Industrials contain a large number of tables of comparative income accounts and balance sheets which are now published for the first time. The general index gives the names of merged companies with references to the companies into which these have passed. The price of the three manuals comprising the complete issue for 1913 is $20.

Some experiments on the linear expansion of nickel steel were recently reported by A. Werner in the Zeitschrift für Dampfkessel und Maschinenbetrieb. Steel with 5, 25 and 33 per cent. nickel was studied and the last showed much the least expansion. For example the expansion length and for 150 deg. 0.119 mm. For 200 deg. the excorresponding to 100 deg. C. was 0.009 mm. per meter of pansion was 0.386 mm. per meter.

Obituary

Gen. Edward F. Jones

Gen. Edward F. Jones, scale manufacturer, died at his home in Binghamton, N. Y., August 14, aged 85 years. He was born in Utica, N. Y. When about 16 years old, he secured employment in a wholesale dry goods store in Boston.

Entering the military service as a private, he became an officer of the Prescott Guards, of Boston, and at the breaking out of the Civil War was elected major, then colonel, of the famous Sixth Massachusetts Regiment, which under his command was the first regiment in the country to respond to the call for troops in April, 1861, of President Lincoln, and was the one attacked by a mob in passing through Baltimore. He afterward recruited the Twenty-sixth Massachusetts Regiment, which was attached to General Butler's division, organized for the purpose of capturing New Orleans. He was mustered out at the close of the war as a brigadier general.

Returning to private life, General Jones was elected

GEN. EDWARD F. JONES

a member of the House of Representatives of Massachusetts for the session of 1865. In October of that year he moved to Binghamton, N. Y., where he established the Jones scale works in 1866, incorporated as "Jones of Binghamton," and devised the advertising slogan, "Jones—He Pays the Freight," which became famous. The significance of this phrase was that his scales, largely of platform and wagon weighing capacities, with a good assortment of counter, Union and kindred scales, were sold, with freight paid to destination, largely to consumers, especially farmers. In 1885 he was elected Lieutenant-Governor of New York, and was re-elected in 1888.

General Jones had been blind and out of active business life for a large part of the last decade. To keep his mind employed in the first days of affliction, he invented an ingenious pad for the guidance of the sightless in writing. He also took up the art of knitting, producing remarkable results, following out by sense of touch the making of intricate designs. He was a member of the Order of Founders and Patriots of America, Society of Colonial Wars, Sons of the American Revolution, the Loyal Legion, the Army and Navy Club of Washington, the Ancient and Honorable Artillery Company of Boston, and several other social, fraternal and charitable organizations.

James Stephen Jeans, former secretary of the Iron and Steel Institute, died at his residence at Clapham Common, England, July 31, aged 67 years. He was born in Elgin, England, was trained in the publishing business and served on a number of newspapers, eventually becoming owner of the Iron and Coal Trades Review, the Foundry Trade Journal, and other publications of that class. He was appointed secretary of the Iron and Steel Institute in 1877, serving until 1893, and edited 35 volumes of the Proceedings of that body. From 1878 he prepared and published the Annual Statistical Report of the British Iron Trade Association, of which body he acted as secretary from 1877 to 1908. Mr. Jeans was an untiring worker and a voluminous writer. He organized an inquiry in 1895 into Continental iron-making conditions, and seven years later an inquiry into American industrial conditions and competition. He was author of "Steel: Its History, Manufacture, and Uses." "England's Supremacy," "Railway Problems," "Waterways and Water Transport," "Rings, Trusts, and Corners," "Industrial Conciliation," and "Canada's Resources and Possibilities." For several years he was a contributor to *The Iron Age*.

George W. Jackman, Bridgeport, Conn., founder and for many years the head of the Springfield Mfg. Company of that city, manufacturer of abrasive wheels and grinding machines, died August 15, aged 62 years. Born in Barre, Vt., he started his career as a railroad man, and soon afterward entered the granite business. Founding, with others, the Springfield Emery Wheel Company, Springfield, Mass., he was made its president, and some 25 years ago moved it to Bridgeport. In 1900 the present corporation name was given the business. In 1908 he sold his controlling interest to Hermann F. Brandes, and founded the New England Supply Company. He was a member of the Algonquin Club. He leaves a widow and a daughter.

Charles F. Terhune, vice-president William M. Crane Company, gas stove manufacturer, New York, died August 10 in the Roosevelt Hospital, in that city, of septic poisoning, after a short illness, aged 62 years. He was a native of New York and had been connected with the company for more than 30 years. He leaves a widow and one son.

A. R. Jardine, one of the owners of the Douglas Foundry & Machine Works, Douglas, Ga., died August 4, of acute indigestion. He leaves a widow and eight children.

James N. Payne, who some years ago was a prominent pig-iron salesman in the Philadelphia district, being connected at different times with Rogers, Brown & Warner, C. R. Baird & Co., and Crocker Brothers, died suddenly August 18 in Philadelphia. He had not been identified with the iron trade for several years.

Harry B. Blackburn, chief of the cost and abstract department of the National Tube Company, Pittsburgh, died August 12 from pneumonia, aged 45 years. He had been connected with the company for 22 years.

Isthmus Coal-Handling Machinery Bids

Washington, D. C., August 19, 1913.—The Isthmian Canal Commission will within a week or ten days announce from its Washington office the awarding of the contract for furnishing and erecting at Cristobal and Balboa, Canal Zone, Isthmus of Panama, coal-handling machinery and accessories for two coaling plants. Bids for these plants were opened in June, and at the offices of the commission here it is stated that the award has been made on the Isthmus and is now on its way here. The specifications call for four unloading towers for the Cristobal plant, two for the Balboa plant, two duplex stocking and reclaiming bridges for both Cristobal and Balboa each, and conveying systems, etc., at both places.

The present intention of the Government is to establish at the places named—one on the Atlantic terminus and one at the Pacific terminus of the Panama Canal—coal-handling plants and storage facilities for the furnishing of coal to naval vessels and its sale to merchant vessels. The commission will require that the coaling plants be completed 18 months after the awarding of the contract. Following are the bidders: David Duncan Company, New York, $3,262,490; Hunt Construction Company, New York, $3,350,497; August Smith, Bayonne, N. J., $2,300,000; W. L. Bull, Jr., New York, $3,894,750. The Welman-Seaver Morgan Company, Cleveland, Ohio, and the Woodford Engineering Company, Chicago, Ill., were also bidders, submitting alternative propositions. W. L. C.

Pittsburgh and Vicinity Business Notes

The Westinghouse Air Spring Company, Pittsburgh, has increased its capital stock from $2,000,000 to $2,500,000. It makes air springs for automobiles and other vehicles under patents granted some time ago to George Westinghouse.

George Best, for 12 years president of the Best Mfg. Company, Oakmont, Pa., near Pittsburgh, has severed that connection, and with his son George H. Best has organized the Best Pipe Engineering & Supply Company, with offices at 3026 Liberty avenue, Pittsburgh. The new company will design and furnish pipe for nearly all purposes, especially gas and steam lines.

The second blast furnace of the Pittsburgh Steel Company at Monessen, Pa., will blow in late this month or early in September, the first stack having started August 5. These furnaces are each 90 ft. high, 22½ ft. in diameter at the bosh, with an estimated daily capacity of 450 to 500 tons for each. The company will use direct metal from the blast furnaces in its open-hearth steel plant. It is getting its coke supply from the W. J. Rainey Company in the Connellsville region and is stated to have bought a large ore property on Cuyuna range, Minnesota.

Hubbard & Co., Pittsburgh, manufacturers of railroad tools and supplies, will build a new forge shop, 75 x 500 ft., which will have a 66-ft. runway for a 5-ton crane. About 250 tons of structural steel will be required, and plans are in the hands of Prack & Perrine, engineers, Keystone Building, Pittsburgh.

E. W. Bentley, Diamond Bank Building, Pittsburgh, has been appointed representative in the Pittsburgh district of the Reading Iron Company, Reading, Pa., manufacturer of a line of power plant equipment, including the Illmer gas engines in sizes from 300 to 2000 hp. and the Reading gas producer.

The O'Brien Steel Construction Company, Washington, Pa., has been organized with a capital of $25,000. A Pennsylvania charter was taken out last week.

Bids for installing a steam-driven air compressor to operate the lock gates of dam 28, Ohio River, were opened at Wheeling last week by Major F. W. Alstaetter, United States engineer corps, as follows: Ingersoll-Rand Company, Park building, Pittsburgh, $3100; Bury Compressor Company, Erie, Pa., $2714; Blaisdell Machinery Company, Peoples Bank Building, Pittsburgh, $3480; Hall Steam Pump Company, Pittsburgh, $2700. The installation includes two vertical air receivers, 66 in. by 18 ft.

F. G. Allen, 1201 Park Building, Pittsburgh, representative in that city of Warren Webster & Co., Camden, N. J., has received a contract from the American Sheet & Tin Plate Company for a 4000 hp. induction feed water heater for installation in its Scottdale works.

The Wheeling Steel Casting Company, recently organized, is building a steel foundry at Kenova, W. Va., to be equipped with a 15-ton open-hearth furnace, and which will be ready for operation within a few weeks. L. H. Collingwood, 304 Oliver Building, Pittsburgh, is general sales agent of the company.

President W. E. Jones, of the Ohio Tool Company, which is completing its factory in Charleston, W. Va., announces that the plant will begin operations not later than September 10. To begin with 200 men will be employed and this number will be increased as the machinery is removed from Auburn, N. Y., and Columbus, Ohio.

A. F. Thompson will engage in the manufacture of gas and electric supplies in Huntington, W. Va. He holds 11 patents for gas appliances designed for economic consumption, including the Eco arc lamp.

The Campbell Brothers Ice Company, St. Albans, W. Va., has been incorporated with $25,000 capital by J. M., Myron G., Virgie I., Howard M. and J. Albert Campbell, to conduct a general cold storage business.

Fire destroyed the plant of the Eastern Glass Works, owned by F. Merten's Sons, South Cumberland, Md. The plant was to have begun the manufacture of window glass September 1. The loss was $50,000.

The Hazel-Atlas Glass Company, Wheeling, W. Va., has awarded the contract for building a new power plant.

The electrification of the Bluefield-Vivian section of the Norfolk & Western Railroad, tapping the Pocahontas coal fields, has reached another stage in the award of a contract to the Westinghouse Electric & Mfg. Company for 26 electric locomotives of 130 tons each, power plant apparatus of 27,000 kw. capacity and all the electrical apparatus necessary. Single-phase current of 25 cycles at 11,000 volts is to be supplied to the locomotives from overhead trolley wires. Two electric locomotives are to replace the three Mallet locomotives used on the heavy grades for the present trains, hauling as high as 3250 tons on a 2 per cent. grade. The locomotives are to run at speeds of 7.14 and 26 mills an hour. The contract calls for the completion of the work in the summer of 1914.

Unusual action was taken by Judge Bradford of the United States District Court, Wilmington, Del., August 8, in ordering James P. Winchester and Howard T. Wallace, receivers for the Diamond State Steel Company, to pay back $21,467.85 to the estate of that ill-starred corporation. The judge sustained the master's report made some time ago, in which the receivers were surcharged for expenditures alleged to have been "improperly, unnecessarily and extravagantly" made for wages, salaries, office expenses, rents, traveling expenses and divers other items. In addition the master cut down the allowances asked by the receivers for their compensation and counsel from $50,000 to $37,000.

On its next pay day, the Youngstown Sheet & Tube Company, Youngstown, Ohio, will give to each employee who has been on its pay rolls for six months continuously prior to June 30, six per cent. of his earnings for the year. It will thus distribute among its employees about $300,000. A few will receive more than $250 each. The profit distribution plan includes all employees from office boys up, with the exception of the men working on a tonnage basis.

The Erie Railroad has ordered 40 Mikado locomotives from the American Locomotive Company and 10 Pacific type locomotives from the Baldwin Locomotive Works. The latter company has also received orders for eight consolidation locomotives for the San Antonio & Aransas Pass Railroad. The Columbus & Hocking Valley has also ordered eight engines from the American Locomotive Company.

The Ferracute Machine Company, Bridgeton, N. J., celebrated its centennial August 16 by means of a garden party given by President Oberlin Smith and his wife at their home, Lochwold, adjoining the works. A souvenir card of invitation sent to the employees and friends of the company gave a view of a portion of the president's house with the office of the company in the background.

The Illinois Steel Company will build a warehouse at St. Paul, Minn., which will occupy eight acres and comprise four buildings, as follows: One, 275 x 500 ft.; one, 200 x 500 ft.; office building, 40 x 70 ft., three stories; garage, 60 x 70 ft. The site is entered by the Northern Pacific and Minnesota Transfer tracks. The estimated cost of the buildings is $250,000.

The Low Moor Iron Company blew out this week its furnace at Low Moor, Va., which has been active since December, 1912, and it will be relined. The Covington, Va., furnace of the same company will soon be put in blast.

A company engaged in the manufacture of hardware and other iron and steel products is seeking a manufacturing building located in the Middle West containing 250,000 sq. ft. of floor space.

The Sims Heater Company, Erie, Pa., has completed the erection of a new machine shop, of brick and steel construction, 100 x 200 ft., one and two stories.

Accidents in Iron and Steel Mills

A Comparison for the United States and Germany Covering the More Serious Classes

e recently issued report on accidents and accident ntion in the iron and steel industry of the United s,[1] published by the Bureau of Labor Statistics at ington, does not afford correctly an opportunity to are American conditions with those of foreign coun- Since such a showing of the status of this country is eat interest to American producers of iron and steel e glad to publish the results of a study of the figures ined in the American report and of those found in l German publications.

he table which follows is the result of isolating those s of accidents which would be compensable if our ican mills were operating under a law similar to of Germany. These classes are those accidents pro- g: 1, death; 2, permanent injury; 3, temporary dis- y over 13 weeks. In German official publications the d class is subdivided according to the degree of dis- y arising from the injury, whether total or partial. author of the American report advises us that such sion of the American figures was impracticable. The is arranged according to the German classification the limitation stated above.

nits in American steel mills which would be subject to compensation under German law.

ch unit of the following table includes blast furnaces, steel and rolling mills. Nearly all have some form of foundry, steel or iron.]

		Fatal.		Permanent injury.		Temporary disability over 13 weeks.		Total.	
	300-day workers	Number	Rate per 1,000	Number	Rate per 1,000	Number	Rate per 1,000	Number	Rate per 1,000
lant for 7 years:									
...	6,406	19	2.97	14	2.19	15	2.34	48	7.49
...	7,494	39	5.20	18	2.40	30	4.00	87	11.61
...	7,580	25	3.30	18	2.37	50	6.60	93	12.27
...	4,575	12	2.62	5	1.09	24	5.25	41	8.96
...	6,215	14	2.25	8	1.29	26	4.18	48	7.72
...	7,642	12	1.57	5	.65	29	3.79	46	6.02
...	6,257	9	1.44	1	.16	35	5.59	45	7.19
ge.	46,169	130	2.82	69	1.49	209	4.53	408	8.84
rge individual plants in 1910:									
...	7,642	12	1.57	5	.65	29	3.79	46	6.02
...	6,137	4	.65	15	2.44	19	3.10	38	6.19
...	5,461	4	.73	14	2.56	22	4.03	40	7.32
...	4,131	7	1.69	10	2.42	15	3.63	32	7.75
...	8,109	19	2.34	7	.86	40	4.93	66	8.14
...	2,907	11	3.78	3	1.03	12	4.13	26	8.94
...	4,185	11	2.63	5	1.19	23	5.50	39	9.32
...	2,348	5	2.13	4	1.70	13	5.54	22	9.37
...	6,225	20	3.21	11	1.77	30	4.82	61	9.80
...	3,369	11	3.27	14	4.16	8	2.37	33	9.80
...	6,833	14	2.05	25	3.66	33	4.83	72	10.54
...	1,491	7	4.69	5	3.35	5	3.35	17	11.40
...	3,472	11	3.17	33	9.50	6	1.73	50	14.40
...	9,726	24	2.47	25	2.57	101	10.38	150	15.42
...	5,572	22	3.95	58	10.41	29	5.20	109	19.56
age.	77,608	182	2.35	234	3.02	385	4.96	801	10.32
maller plants in 1910:									
	24,607	32	1.30	104	4.23	38	1.54	174	7.07
l, 62 plants in 1910:									
	102,215	214	2.09	338	3.31	423	4.14	975	9.54

Before passing to comparative comment upon this table, s desirable to explain why such comparison must be ricted to Germany. It is the only country publishing res covering a sufficient period of time and in such n that a reasonable assurance is possible that they are ly comparable with the American data. At the outset an attempt to compare conditions in the two countries the basis of their accident rates, certain difficulties st be carefully stated in order that their bearing upon comparison may be understood.

The group of industrial establishments included in many under "Eisen und Stahl" is not the same as that ch has been assembled as representing the iron and l industry in the United States. The report from which data regarding American conditions are drawn limits lf to blast furnaces, steel works, rolling mills and steel ndries. In Germany, along with these are included foundries, the great machine building establishments, Obviously comparison of groups so largely different afford no intelligible results. It is necessary, there- e, to find if possible a German group sufficiently similar the American to justify comparison.

[1] Conditions of Employment in the Iron and Steel Industry. IV. Accidents and Accident Prevention.

A study of the German publications and the statements of iron and steel men familiar with German conditions indicates that of the six trade associations which make up the iron and steel industry the works of the Rhenish-Westphalian Blast Furnace, Steel Works and Rolling Mill Association are most closely similar to the American plants whose rates are given above. The name of the association suggests similarity, and knowledge of the establishments included in it confirms the idea that it is the German group most closely similar to that considered in America. It is certain that it includes a larger proportion than do the American plants of what may be called machine shop occupations. These being relatively less hazardous than those of steel works proper must tend to depress the German rates.

American Death Rate Higher

For the whole of a 12-year period extending from 1897 to 1908 this association had the following rates[2] per 1000 300-day workers: Fatal, 1.08; permanent injury, 8.56; temporary disability over 13 weeks, 4.17. Total, 13.83. An inspection of the figures given in the table will at once show that the American death rate is quite constantly higher, while permanent injury and temporary disability have lower rates. There is good reason to believe that this lower German death rate is, in part at least, due to the inclusion of the less hazardous occupations, but the American report clearly demonstrates that with all the progress that has been made a considerable number of American mills still have an abnormally high number of deaths.

It is unfair, however, to confine attention to the death rate. The broadest possible ground of comparison is none too broad as a basis for conclusions. It will be observed that the rate for all cases compensated in the 12 years, namely 13.83, is higher than that of 12 out of 15 large American plants in 1910, is higher than the average of all American plants, and also that the single plant presented for a series of years has not during that interval had as high a rate.

It is possible to approach the question from another standpoint. At intervals of 10 years the German Imperial Insurance Officer has made a very complete study of a single year. The most recent of these is for the year 1907[3]. At page 214 of this discussion it appears that in 1907 the Arnsberg and Duesseldorf districts of Rhenish-Westphalia had 93,331 300-day workers. Among these there occurred 1752 compensable accidents. This is at the rate of 18.77 per 1000 300-day workers. These two districts are probably a little more exactly comparable with American mills than is the entire Rhenish-Westphalian Association. For the entire empire the rate in 1907 for blast furnaces, steel works and rolling mills was 17.40 per 1000 300-day workers. From the annual reports of the Rhenish-Westphalian Association it appears that the rates were as follows in successive years: In 1908, 16.5 per 1000 300-day workers; in 1909, 15.2 per 1000; in 1910, 14.6 per 1000.

It will be noted that in these years a steady and decided decline in the rates occurred. The rate of the last and lowest year (14.6) is higher than that of 12 out of 15 large American plants in the same year.

While these figures must be taken with due allowance for the imperfections inseparable from diverse classification, it is evident that the American steel industry has no reason to feel ashamed of its recent progress toward industrial safety. It cannct be denied, however, that there are still isolated cases in this country in which conditions are worse than would be tolerated by any of the industrial nations of Europe.

The Nelson Valve Company, Chestnut Hill, Philadelphia, Pa., has made arrangements with J. W. Carter, 6 Peters street, Atlanta, Ga., to represent it in that section. He will carry a stock of all popular sizes and types of gate, globe and check valves to take care of orders he will receive.

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[2] Schriften des Vereins Deutscher Revisions-Ingenieure, No. 10; 25 Jahre Unfall-verhütung, Berlin, 1910, p. 34.

[3] Amtliche Nachrichten des Reichs-Versicherungsamts, 1910, I. Beiheft I Theil. Gewerbe-Unfallstatistic für das Jahr 1907.

The Machinery Markets

While there is a good deal of diversity in reports as to machinery market conditions in various parts of t country, the belief is fairly general that improvement is not far off. This is true particularly in those cities or near the great agricultural sections where crop conditions have been improved by needed rains. New Y has a fair amount of activity considering that vacations are in full swing. In Philadelphia there is not a gr deal doing. New England reports a continuance of the improvement noted a week ago. The molders' strike still a hindrance in Cincinnati; but the teamsters' strike has failed and a speedy clearing up of labor troubles looked for. In that city some machine tool houses complain of a lack of new business, both domestic and e port. Detroit continues to have a fair run of single tool sales, with the demand for woodworking machine better than that for metal working tools. From the Central South is reported a turn for the better as a res of general rains in that territory. Poor crop conditions, which have since improved, are held accountable f a steady decline in business in St. Louis. In Texas the important demand is for cotton gin and road-maki equipment, with a better crop outlook helping things along. Though some fair orders have come out on t Pacific coast, trade is rather quiet and the lumber trade is not as active as it should be. Good shipments agricultural machinery are being made to Siberia and the Orient.

New York

NEW YORK, August 20, 1913.

Considering that the vacation season is at its hight a fair amount of business is coming to light and to date the aggregate is better than it was in the corresponding period of last month. Trade is of the scattered, miscellaneous sort for the most part and with it is a corresponding amount of inquiry, though much of the latter is not expected to close before fall. Deliveries are easily made in practically all classes of machinery, the only exception being in some of the newer machine tools of special types. No large propositions are before the trade. The railroads are practically out of the market for shop equipment except for occasional demands for one or two tools. Collections continue rather slow. Export agents report a livelier tendency on the part of manufacturers to form connections for representation in Europe, many of them having been impressed in recent months by the success of others in the foreign field, while the large number of Americans who have gone abroad this summer has also served to turn attention to the markets on the other side.

The S. Flory Mfg. Company, Bangor, Pa., founder and machinist, whose plant suffered severely from fire about ten days ago, took prompt steps for the re-equipment of its plant and has placed an order for machinery to the value of about $30,000 with a New York house.

The Mechanicsville Electric Light & Gas Company, Mechanicsville, N. Y., is in the market for additional power plant equipment, including one 150-hp. boiler with feed-water heater; also pump motor. Address Edward Farrow, manager.

The Bausch & Lomb Company, manufacturer of optical goods and specialties, Rochester, is having plans prepared by Leon Stern, architect, for an extensive addition to its factory.

The United States Steel Furniture Company, Syracuse, N. Y., is letting contracts for an addition to its plant on South West street.

The Amsterdam Broom Company, Amsterdam, N. Y., is having plans prepared for an addition 50 x 175 ft., which it will make to its factory this fall.

The General Railway Signal Company, Rochester, has finished plans for a large addition to be made to its foundry at once.

Plans are in preparation for the rebuilding of the plant of the Fairfax Bros. Wall Paper Company at Geneva, N. Y., which was recently destroyed by fire.

The general contract for the erection of a three-story factory 81 x 81 ft., to be added to the plant of the Rudolph Wurlitzer Mfg. Company, Buffalo, maker of musical instruments, has been let to the Turner Construction Company, Buffalo.

The Oneida Steel Pulley Company, Oneida, N. Y., is completing plans for an extensive addition to be made to its plant in that city.

The Carborundum Company, Niagara Falls, N. Y., has awarded the contract for the erecting of a three-story addition 65 x 100 ft. to its plant to the Turner Construction Company, Buffalo.

The Laidlaw-Dunn-Gordon Company, Buffalo, has been awarded the contract for a steam pump for the city pumping station at Fulton, N. Y.

The Continental Rubber Company, Erie, Pa., h completed plans for a four-story addition of reinforc concrete construction to be made to its plant.

The Board of Village Trustees, Weedsport, N. Y., preparing plans for the building of an electric lighti plant and has applied to the Public Service Commissi for permission.

Duncan W. Peck, superintendent of public work Albany, will receive bids until September 3 for co structing a guard gate and sluice gate on the Er Canal between Lock 6 and the present guard gate.

The Olympian Knitting Company, New Hartfor N. Y., is adding a four-story mill construction buildi 50 x 154 ft., to its plant. Griffith & Pierce, Utica, N. Y are the contractors. A power house, 35 x 47 ft., wi also be erected. The boiler will be 150 hp.

Philadelphia

PHILADELPHIA, PA., August 18, 1913.

Midsummer dullness characterizes the market. Th vacation season is believed to have considerable bea ing on the absence of new demand. Inquiries ar light and confined almost entirely to single tools. A fair proportion of pending business has been closed although individual orders are small. The Pennsyl vania Railroad has placed definite orders for a few tools with various concerns, against some of its re cent inquiries. Machine tool builders generally report a lighter volume of new business. There has been little doing in the export trade. Power plant equip ment continues in moderate demand, with some good sized projects in sight. The second-hand machinery tool, and power equipment demand drags. The foundry trade is quieter; steel casting plants are operating, as a rule, on a decidedly less active basis.

The board of awards, Philadelphia, will receive bids until September 10 for several pumps and for electrical equipment.

Bids are being received for the new power house for the Ontario Dyeing Company to be erected at Ontario and D streets, Philadelphia. Plans provide for a two-story building, 42 x 93 ft.

The branch office of the Best Mfg. Company, Pitts burgh, Pa., manufacturer of valves, pipe, fittings, etc., has been moved from the Real Estate Trust Building to the Arcade Building. W. J. Spencer is the company's Philadelphia representative.

The contract for the five-story brick and concrete storage building and power plant, to be erected for Sklaroff & Son, 710 to 714 South Second street, has been awarded to William R. Dougherty. The main building will be 50 x 136 ft. and the power house 30 x 75 ft.

It is stated that plans have been prepared for additions to cost about $50,000 to the plant and equipment of the Clawson Company, manufacturer of extracts and spices, 240 Chestnut street.

The Bridgeport Foundry & Machine Company, Bridgeport, Pa., has been incorporated with a capital stock of $30,000. B. F. Evans, J. J. McGurk, J. C. Land and Oliver F. Lenhart, Norristown, Pa.; J. J. Murphy, Bridgeport and Reuben Kriebel, Trappe, Pa., are named as incorporators.

Frank Schanz, architect, Wilkes-Barre, Pa., is reed to be preparing plans for a three-story brick and crete laundry building, 50 x 100 ft., and 25 x 50 ft., the Hassler Laundry Company of that city.

The Trenton Plate & Window Glass Company, nton, N. J., is understood to be considering the tion of a new plant on South Broad street, in that

The Public Service Corporation of New Jersey is ceeding with its programme for the building of a power plant at Burlington, N. J. A six-acre site acquired some time ago, located on the Delaware r. The company has recently secured riparian rights the river frontage. Plans adopted call for the struction of a station that will ultimately have a acity of 50,000 kw., with provisions for still further nsions. A building, 100 x 200 ft., will first be erected h will include a boiler room having a capacity for 600-hp. boilers. Edgemoor boilers will be installed. l-handling facilities, having a storage capacity of 00 tons, will be provided. A 50-ton crane, with a on auxiliary, will be installed in the power house. capacity of the initial power generating unit will 000 kw. Excavation work for the new power plant dations has been started.

New England

BOSTON, MASS., August 19, 1913.

The improvement which was noted last week con- es, various lines having felt a new impetus, some of ahead of the usual seasonable time. Orders are g received by at least a large number of the ma- e tool builders in normal volume, and inquiries are ring. Business is still something of the hand-to- th sort, a large majority of orders in most lines be- of moderate size for quick delivery. A heavier buy- movement is expected for the autumn. The cotton stry is improving, and this should reflect on the tex- machinery business, which is dull, especially in cot- making equipment. However, replacements of an- ted machinery, a result of the impending tariff act. unt to a considerable total. The labor situation inues to improve as regards strikes, but good me- ics are hard to obtain. The boilermakers have tically given in to their employers.

The jewelry manufacturers of Providence, R. I., and eboro, Mass., are experiencing a sharp improvement usiness at no later date than usual, and in some s earlier, which is considered indicative of a good on.

The Pope Mfg. Company, Hartford, Conn., has de- d to sell what is known as the West works, and sfer the assembling of heavy trucks to the main t. The West works was acquired by the company e months ago, and was formerly occupied by the department of the old Pope Mfg. Company, which nufactured bicycles.

The Easton-Burnham Machine Company, Provi- ce, R. I., manufacturer of textile machinery, is rush- work on its machine shops with the intention of oc- ying them in the autumn. The present works had to eplaced because of encroachment on the property in abolition of grade crossings, and the result will be s essentially modern in all details of design and pment. The main building, which will be the ma- e shop proper, will be 75 x 286 ft., with an ell for es 40 x 40 ft., while the forge shop will be 40 x 130 wo stories.

The Silver Plate Cutlery Company, Shelton, Conn., increased its capital stock from $60,000 to $80,000. portion of the amount has been issued to procure s for special machinery for the grinding depart- t.

The new building of the General Mfg. Company, terbury, Conn., manufacturer of rivets, studs and hine screws, will be used to increase the output of regular lines. The increased capacity has been e necessary by the growth of the business.

The Turner & Seymour Mfg. Company, Torrington, n., has increased its capital stock from $250,000 to 000, which will provide funds for improvements al- y made or in process of making. No additional pment will be required.

The Leach & Garner Company, Attleboro, Mass., build a three-story addition 50 x 150 ft. The com- will occupy a portion of the new space and will the remainder to other jewelry manufacturers.

Stone & Webster, Boston, have been given charge he construction of the new buildings for the Massachusetts Institute of Technology, which are to be erected in Cambridge on the bank of the Charles River basin at a cost of $3,000,000.

The American Casket Company will erect a factory at East Springfield, Mass., 47 x 225 ft., one story, together with a boiler house.

The Æolian Company is considering the removal of its large Meriden works to Hartford, Conn., where one department has already been established. Labor troubles at Meriden are responsible for the tentative plan.

Additions to general manufacturing facilities in New England include the following: Otter River Board Company, Otter River, Mass., to rebuild plant destroyed by fire by a structure 66 x 165 ft., two stories; Arthur Gulliver, Norwich, Conn., cotton mill to house 50,000 spindles and 1200 looms; Keyes Products Company, Norwich, Conn., to rebuild burned section of works, which entailed a loss of $30,000.

The Chamber of Commerce of Worcester, Mass., has practically completed arrangements for the erection of a large industrial building.

Announcement is made that the Clark Bros. Cutlery Company, Kansas City, Mo., will combine the recently acquired plants of the American Shear & Knife Company, Hotchkissville, Conn., and the Waterville Cutlery Company, Waterville, Conn., in the former town and will increase the magnitude of the combined business.

Chicago

CHICAGO, ILL., August 18, 1913.

Judge E. P. Caldwell, Waterloo, Iowa, has recently purchased a tract of 875 acres between Harvey and Blue Island, Ill., which will be subdivided and sold as factory sites. Edgar R. Cobb has purchased 43 acres for a factory building; four and one-half acres has been purchased by the Hallet Iron Works for the erection of a new plant, and on another tract of nine acres a specialty rail mill will be erected by Judge Caldwell.

The Armitage Power Saver Company, 7019 East End avenue, Chicago, has been organized for the manufacture of pulley covers by August Ehlert, George J. Suma and Jacob H. Darmstadt.

The Burrell Belting Company, 128 West Kinzie street, Chicago, recently incorporated by Albert Martin, Ernest L. Burrell and Charles S. McDonnell, will manufacture various kinds of belting.

It is reported that the Chicago & Eastern Illinois Railroad will spend approximately $3,000,000 in improvements covering new locomotives and equipment, car shops, steel rails, enlargement of round houses, etc.

C. A. Bremer, 415 South Sangamon street, Chicago, will erect a four-story brick factory building at 6322 Harvard avenue, the cost of which will be $30,000. A. S. Alschuler is the architect.

The General Steel Products Company, Chicago, has been incorporated with a capitalization of $25,000 to engage in manufacturing. W. F. Kaehler, R. S. Draper and C. H. Marquess are the incorporators.

The Forkner Mfg. Company, 502 Chamber of Commerce Building, Chicago, has been incorporated with a capital stock of $250,000 and will manufacture a special line of spring tooth implements and other farm tools. C. E. Forkner is president; J. M. Forkner, vice-president; E. A. Forkner, secretary-treasurer. The company expects to locate either in northern Indiana or Illinois, and as soon as the location has been selected new machinery will be purchased and installed.

The Peoria Brick & Tile Company, Peoria, Ill., with $20,000 capital stock, has been incorporated by Fred R. Carter, Harry E. Man and George T. Page.

The Salzer & Sinclair Railway Appliance Company, Peoria, Ill., has been incorporated with a capital stock of $15,000 by Newton R. Salzer, Clarence M. Sinclair and Jacob Wilverman to manufacture a patented device.

The Allaire Mfg. Company, Peoria, Ill., has increased its capital stock from $200,000 to $400,000 for the purpose of increasing its equipment and extending its operations.

The Christopher Steam Laundry Company, Christopher, Ill., has been incorporated with $14,500 capital stock by J. R. Biby, Roy Lockridge and H. M. Rea.

The Mount Vernon Traction Company, Mount Vernon, Ill., has been given a franchise and will construct and equip an electric street car line with power house, etc., at once.

The Big Four roundhouse at Urbana, Ill., is to be extensively remodeled and improved.

The John Deere Wagon Company, Moline, Ill., has increased its capital stock from $500,000 to $1,000,000.

The Tri-City Railway Company, Rock Island, Ill.,

will shortly advertise for bids for the construction of new car barns to cost $100,000.

Mount Ayr, Iowa, has voted $45,000 bonds for constructing a municipal waterworks system. Water will be pumped from a reservoir to be built about two and one-half miles east of the city. E. T. Archer & Co. are the architects employed by the City Council.

Pomeroy, Iowa, has voted $15,000 bonds for installing an electric light system.

Fergus Falls, Minn., has secured a loan of $35,000 to be used in financing a new waterworks plant.

The Diamond Calk Horseshoe Company, Duluth, Minn., announces plans for the erection of a large two-story addition to its factory at Third street and Forty-seventh avenue.

The waterworks system at Little Falls, Minn., is to be improved and extended.

The Omaha Cold Storage Company, Omaha, Neb., is to erect a large cold storage building, 132 x 154 ft., of reinforced concrete. The total cost is approximately $350,000.

The Atchison, Topeka & Santa Fé Railway is planning the erection of a power house at Topeka, Kan., at a cost of about $100,000.

The Farmers' Oil Tractor Company will erect a new factory at Watertown, S. D., at a cost of $100,000. The plant will be fully equipped, including a modern foundry.

Kimball, N. D., has voted $15,000 bonds for constructing a municipal waterworks plant. Olson & Rassmussen, Kimball, are the engineers.

Swift & Co., Chicago, have prepared plans for a plant at Fargo, N. D.

Cincinnati

CINCINNATI, OHIO, August 18, 1913.

It now seems probable that the different labor troubles that have harassed business in Cincinnati for the past few months will shortly be settled. This is being brought about through the failure of the teamsters' strike, which lasted nearly three weeks. A large majority of the employers flatly refused to recognize the Teamsters' Union in any way, but offered to take their men back as individuals and on the former pay basis, including an advance in wages agreed upon before the formation of the union was considered. The resumption of work in a number of manufacturing plants has already commenced. It is rumored that the foundries now closed down on account of the molders' strike will resume operations at an early date. At the present time there is only one gray-iron jobbing foundry operating in the city, but the stove manufacturers, who have a separate agreement, are nearly all busy. With the machine tool builders there is some complaint as to the scarcity of new business, both domestic and export, although a number of replacement orders have been lately received from the railroads.

Work on the new foundry of the Cincinnati Foundry Company, Winton place, Cincinnati, is proceeding at a rapid rate. With the exception of a few chain hoists, practically all equipment has been purchased.

The Bahmann Iron Works Company, Cincinnati, does not contemplate any immediate additions to its plant at Winton place, as has been recently reported. The company makes a specialty of sugar machinery for export.

Tietig & Lee, architects, Lyric Building, Cincinnati, are receiving figures on a seven-story warehouse building, to be erected at Milton, Ky., for the Susquemac Distilling Company.

Riley & Richards, 218 Fosdick street, Cincinnati, contemplate establishing a small bar and sheet mill in the Central West, and are interested in receiving information on second-hand equipment for the proposed plant.

Stephen E. Wilson, Cincinnati, will build a large garbage disposal plant at Dayton, Ohio, where he has secured a 10-year contract for operating a reduction plant.

Considerable structural material will be required by the Cincinnati Abattoir Company, Cincinnati, for a proposed bridge over Alabama street that will be over 500 ft. long.

The Pennsylvania Railroad Company, through W. C. Cushing, chief engineer, Pittsburgh, Pa., is taking bids for a large addition to the company's shops at Columbus, Ohio. Only power plant equipment will be required.

The Champion Coated Paper Company, Hamilton, Ohio, is buying machinery equipment for its plant, which was almost totally destroyed by fire and water during the recent floods. A recent order for 36 motors was placed with the Lincoln Electric Company, C land, through its Columbus agent.

The Mohr-Minton Coal & Brick Company, Arthur, Ohio, has been purchased by a party of talists, who will make some extensive additions to brick plant, and operate the property under the pre name.

The Delaware Electric Light, Heating & P Company, Delaware, Ohio, will add equipment to crease its present capacity. Part of the nece machinery has already been purchased.

The Hamilton Scale & Tank Company, Ham Ohio, has been incorporated with $250,000 capital s to take over the plant of the Anderson Tool Com manufacturer of self-measuring oil tanks, scales other specialties. The incorporators are H. East J. D. Hopper, A. G. Gale, Robert Kennedy and J Price.

It is rumored that the Business Men's Club, Mid town, Ohio, has made arrangements with outside talists to erect an automobile factory at that point. details are yet available.

A. L. Crowthers & Son, Coshocton, Ohio, will b a large garage, connected with which will be a re shop for which a few small machine tools wil required.

The Central South

LOUISVILLE, KY., August 18, 191

Conditions have taken a turn for the better as result of general rains throughout this section, w put an end to a severe drouth and brought crop p pects up to a satisfactory point. Boiler manufactu are among those who are keeping busy, most of shops working to capacity. There is also more mand for electrical equipment, as numerous pro for establishing and enlarging electric light plant the smaller communities are coming to light. Wo working machinery is moving well, and an occasi call for machine tools is received.

The Louisville branch of the American Oak Lea Company has decided to operate the machinery in cutting department with electric motors, and will b the market also for a dynamo, as it plans to create own current. B. M. Henry is manager of the bra

The Louisville Cotton Mills Company has purcha a pump from the Dean Bros. Steam Pump Wo Indianapolis, as well as a new cooling system the Schutte & Koerting Company, Philadelphia. stead of using a cooling tower, the water is spra through nozzles, the result being equally satisfac but less expensive.

The Continental Coal Corporation of Kentucky been formed in Louisville to retail the product of operating company, and is considering the estab ment of an ice factory. L. P. Powell is manager

The Commissioner of Fisheries, Washington, D. has announced that sealed bids will be received u September 1 for two motor-driven pumps to be stalled at the fish hatchery now being established Louisville.

The church furniture factory of Lausberg & Ma 970 Underhill street, Louisville, was damaged to extent of $15,000 by fire last week. The concern planning to rebuild. Woodworking machinery will needed principally.

The Voss Mantel Company, Louisville, is prepar to equip an addition to its woodworking plant Sixteenth and Arbegust streets. Address Louis V

The White Crown Fruit Jar Company, Louisv has been organized for the manufacture of fruit j The proposed factory will cost between $250,000 $300,000, the incorporators say. J. L. Craig and W. Pickrell are the principal stockholders of the company, which is capitalized at $250,000. Deta plans of the manufacturing plant are not yet availa

The woodworking plant of the Wood Mosaic Flo ing Company at New Albany, Ind., valued at $250 was destroyed by fire August 9. It is stated that ditional ground has been secured and rebuilding op tions will begin at once.

The grain elevator and flour mill of the Zilla Schafer Milling Company, Haubstadt, Ind., near Pri ton, were destroyed by fire August 10, with $ loss. It has not been decided whether to rebuil

The trustees of the Southeastern Hospital at M son, Ind., have decided to make improvements in pumping station, and have awarded the contract additional boilers to the Babcock & Wilcox Comp and for stokers to the Westinghouse Machine C pany.

Harlan, Ky., is considering the installation of a water system, and will receive bids on the necessary equipment in the near future. Harlan is in the heart of the recently opened southeastern Kentucky coal fields.

The Sandy Valley Light & Power Company, Pikeville, Ky., has been incorporated with $20,000 capital stock by John M. Hopkins, James G. Seery and L. S. Wilson.

J. M. Vaughan, Owensboro, Ky., is building a $12,500 addition to his tobacco rehandling plant, and will require special equipment for its operation.

The coal tipple of the Wallen's Creek Coal Company, Middlesboro, Ky., was burned recently with $10,000 loss. It will be replaced at once.

The power plant of the Kentucky Electrical Company, Owensboro, Ky., manufacturer of electrical equipment, was damaged by fire recently.

W. F. Clark, Park's Ferry, Ky., near Carlisle, Ky., is planning the erection of an ice factory.

F. B. Rohtert, Nashville, Tenn., has purchased the plant of the Roemer-Worrick Foundry & Machine Company, Bowling Green, Ky., and will add materially to its equipment. The machine shop will be enlarged to take care of automobile repair work.

The Growers' Warehouse Company, Flemingsburg, Ky., is in the market for a gasoline engine and a hydraulic press as well as other tobacco handling equipment. R. L. Dudley is secretary of the company.

Charles Gray and Walter Rankin, Portsmouth, Ohio, will establish an electric light plant and ice factory at Olive Hill, Ky., according to recently announced plans.

Bradley & Maggard, Morehead, Ky., are equipping a factory for the manufacture of moving picture machines.

The Clay Light & Ice Company, Clay, Ky., is reported to be in the market for a 30-kw. generator, a 50-hp. automatic engine and a switchboard. C. R. Clark is manager.

The Hardingsburg Electric Light & Power Company, Hardingsburg, Ky., will begin the erection of a new plant in the immediate future and will be in the market for all necessary equipment except engine and boiler. Pump, generator and switchboard will be required.

The Lebanon Light, Ice & Power Company, Lebanon, Ky., is planning the purchase of conveying equipment to be used in the operation of a coal and ash-handling plant.

The Knoxville Hoe & Tool Company, Knoxville, Tenn., has been incorporated with $25,000 capital stock and will erect a plant in the near future. J. H. Lester, H. B. Lindsay, R. S. Young, Sam E. Young and G. E. Bell are the incorporators.

The Iron City Stove & Foundry Company, Bristol, Tenn., has purchased the plant of the Dominion Iron Works at Bristol and will consolidate the two businesses. The Iron City Company is incorporated with $150,000 capital stock and expects to enlarge its stove manufacturing operations from time to time.

Henry Rhodes, Whitesville, Tenn., will establish an electric light plant.

The Enterprise Ice & Coal Company, Harriman, Tenn., is planning the construction of a 25-ton ice factory. M. Stowers is general manager of the company.

The Lewisburg Ice Company, Lewisburg, Tenn., plans the addition of a 20-ton ice machine to its equipment.

The Newport Bottling Works, Newport, Tenn., will install a cold storage plant in connection with its soft drink manufacturing business, and is now in the market for the necessary equipment.

The Paris Coal & Ice Company, Paris, Tenn., is considering the installation of a bottling plant, along with a refrigerating equipment for the manufacture of ice and the maintenance of a cold storage department.

The King Bros. Machine Company, Spring City, Tenn. has acquired a location at Harriman, Tenn., where it will establish an automobile repair shop.

The Harriman Granite & Marble Company, Harriman, Tenn., will be in the market for power and stone-working equipment, having secured a lease on a suitable site for its plant.

A boiler and engine will be purchased by the Memphis Cotton Mfg. Company, Central Bank Building, Memphis, Tenn. The company will make absorbent cotton.

The O'Donohoe Safety Guard Gas Stove Company, Nashville, Tenn., has been incorporated with $10,000 capital stock, by M. P. O'Donohoe, R. L. Lewis and others.

The Hoshall-Simmons Company, Memphis, Tenn., is in the market for veneer lathes, clippers, etc.

Swift & Co., Chicago, will erect at Nashville, Tenn., a packing plant to cost approximately $100,000, in the near future.

Barbersville, W. Va., has voted $12,500 bonds for waterworks.

Peacock's Iron Works, Selma, Ala., will purchase a drill press and a lathe, both second-hand.

The plant of the Lancaster Cotton Oil Company, Lancaster, S. C., was recently destroyed by fire with $50,000 loss.

C. L. Carroll, superintendent, Jacksonville, Fla., will receive bids until September 15 for pumping engines, 12,000,000 and 15,000,000 gal. capacity.

Detroit

DETROIT, MICH., August 18, 1913.

Little change in the situation in the machinery market locally is noticeable. A fair run of orders for single tools was booked the past week; but no transactions of magnitude were reported. Inquiries have slackened to a certain extent in metal working lines but there has been a corresponding increase in the demand for woodworking equipment. Sawmill and flourmill machinery are receiving some attention. The second-hand machinery market has sagged once more and sales reported were of minor importance. There is no doubt that many manufacturers are feeling the effects of the tight money market and while little is said openly there is considerable uneasiness in manufacturing circles and many concerns are inclined to extreme conservatism in operating their plants.

A permit has been issued to the Detroit City Gas Company for the erection of a one-story pumping station, about 41 x 97 ft., on Newton avenue, between Dubois street and St. Aubin avenue, to cost $5600.

The General Service Auto Company, Detroit, with offices in the Buhl Block, is designing and will shortly start manufacturing motors for cycle cars.

Albert F. Mais and Ben Marks, Detroit, have incorporated the Internal Gear Drive Company to build light delivery commercial wagons.

The Sterling Motor Works, Detroit, has taken over a portion of the factory formerly occupied by the Chevrolet Motor Company and will manufacture motors for cycle cars. William C. Little is at the head of the Sterling Motor Works.

The Automatic Muffler Mfg. Company, Detroit, has been incorporated with $15,000 capital stock to manufacture and deal in mufflers and other automobile accessories.

The Zenith Carburetor Company, Detroit, is removing to the former factory of the Armstrong Woolen Mills, at the foot of Vanda avenue, which will give the company larger quarters.

The Studebaker Corporation, Detroit, has purchased the plant known as the Vulcan Gear Works, Pontiac, Mich., which was formerly a part of the Flanders Mfg. Company. The factory will be utilized for the manufacture of gears for the Studebaker automobiles.

The receiver's sale of the Warren Motor Car Company, Detroit, to the Rands Mfg. Company, Detroit, has been confirmed by the courts.

The Vanguard Mfg. Company, Detroit, has been incorporated with $10,000 capital stock, to manufacture automobile engines, machinery and equipment. Charles F. Jensen is the principal stockholder.

The Monarch Motor Car Company, Detroit, has secured factory space in the former Carhartt Motor Car Company factory on Jefferson avenue, and work has been started on the first cars.

The Morgan & Wright Tire Company, Detroit, has just started the removal of machinery to its new buildings recently completed. This will add 400,000 sq. ft. of floor space to the factory. A like addition of 400,000 sq. ft. will be ready April 1, next, when this tire plant will be the largest in the world. The power plant of the company has been doubled.

A contract has been awarded to the Benjamin Douglas Company, Detroit, for the construction of a reinforced concrete spillway, waste gates and power house for the Argo plant of the Eastern Michigan Edison Company. The power house will measure about 45 x 95 ft. and will accommodate two vertical direct-connected generating units, one a three-phase, 60-cycle 2300-volt machine and the other a 450-kw., 600-volt direct-current generator, both driven by hydraulic turbines. In the power house building there will be also two motor-generator sets of 500 kw. each, for use on the street railway load; also two banks of step-down transform-

ers each bank consisting of three single-phase transformers of 333 kw. each.

The Detroit Saw & Tool Works, Detroit, Mich., has been incorporated with a capital stock of $15,000.

The Grant Bros. Foundry Company, Detroit, Mich., has let the contract for a factory building to be erected at 597 Beaufait avenue. Steel sash will be furnished by the Detroit Steel Products Company.

The Barnes Wire Fence Company, 775-777 Grand River avenue, Detroit, Mich., plans the erection of a new factory building in the near future. The size of the building will be approximately 60 x 100 ft., three stories. The company will install mostly new machinery for making wire fence, guards, and engaging in other kinds of wire work.

Correcting an item in *The Iron Age* of August 7, the Challenge Machinery Company, Grand Haven, Mich., advises that the addition to its plant has not been definitely decided upon.

The Brunswick-Balke-Collender Company, Muskegon, Mich., is figuring on an addition to its boiler room, 60 x 85 x 35 ft., in anticipation of the immediate installation of three new 400-hp. water-tube boilers. Contract has been let for another building, 50 x 135 ft., to house four dry kilns, and the present iron stack at the power plant is to be replaced by one of reinforced concrete.

The Cummer-Diggins Lumber Company, Cadillac, Mich., is planning the erection of a new power plant, to cost $60,000, which will involve an entire change of the conveyor systems now connected with the mill and chemical plant. Actual work will probably not be started until winter.

The Bremer-Wilson Mfg. Company, of Chicago, Ill., manufacturer of various machine specialties, including a triple Ford engine starter for Ford automobiles, a triple Ford slip cooler, triple auto lock, motor boat reverse, etc., will move its plant to Benton Harbor, Mich. A new factory building will be erected at that place.

The village of Britton, Mich., has granted a franchise to the Tecumseh Electric Company, for the furnishing of electricity from that company's plant at Tecumseh, Mich. The lighting contract with the company provides for a pumping station for fire protection.

Ground has been broken by the Pontiac Motor Castings Company, Pontiac, Mich., for an addition to its factory, which will be used for the manufacture of gray-iron castings. The new structure will be 50 x 60 ft.

The Au Sable Electric Company, Au Sable, Mich., has increased its capital from $500,000 to $1,500,000.

The City Ice Delivery Company, Cleveland, Ohio, has taken over the business of the Interstate Ice Company, including plants at Hillsdale, Devil's Lake, Norvel and Addison, Mich. The Cleveland company manufactures artificial ice and will expend about $40,000 for machinery at the Hillsdale plant.

Milwaukee

MILWAUKEE, WIS., August 18, 1913.

There is a continuance of the improved feeling in the machinery industry in this district, and encouragement is met all along the line. Tool builders have been particularly fortunate in the matter of bookings, and, while no large orders are reported, the run of individual and small lot business is keeping shops busy. The Allis-Chalmers Mfg. Company, the largest heavy machinery interest in the district, is reported to be planning generous extensions and will be a good buyer of machine shop equipment within a few weeks.

N. C. Miller & Son, Dodgeville, Wis., have purchased property and will establish a large plant for the manufacture of hay tools and other agricultural implements. Two new buildings will be erected at once, and the firm will be in the market for a miscellaneous list of tools. It is their intention to engage in structural and bridge work and to develop a number of inventions of automobile parts.

The Allis-Chalmers Mfg. Company, Milwaukee, has awarded contracts for the construction of two new buildings at its West Allis works, which are already considered among the largest of their kind in the world. The buildings will be a machine shop and a boiler shop. The purpose of the new construction is to make provision for housing the mining machinery and boiler steel work which the old company had carried on at its Chicago shops for many years. It is the intention to move the two departments to Milwaukee early in the fall. No information is available as to the disposition of the two Allis-Chalmers plants in Chicago. Gen. Otto H. Falk, president of the company, has just returned from Canada, where he spent a week on business relating to the Canadian works. He reports business conditions fairly satisfactory.

The Milwaukee Die-Casting Company is the new corporate title of the American Safety Appliance Company, foot of Mason street, Milwaukee, which devotes most of its attention to the production of aluminum alloy die-castings, and specializes in castings for electric head and side lights for automobile purposes. The change in name is made to more appropriately distinguish the concern.

Heyl & Patterson, Pittsburgh, Pa., were awarded the contract for installing a modern screening plant and making other improvements to the coal docks of the C. Reiss Coal Company, at Sheboygan, Wis. The plant will have a capacity of 200 net tons daily. The C. Reiss Company is about to spend $100,000 in doubling the storage and coal handling facilities at its dock No. 1, St. Louis Bay. The contract was awarded to the Wales-Campbell Company. The dock will be extended 600 ft. and an entirely new equipment of hoists and rigs, operated by electricity, will be installed.

The Oshkosh Gas Light Company, Oshkosh, Wis., has appropriated $150,000 for improvements to its plant and distributing system, and for the installation of equipment to produce water gas. A new boiler house, pumps, steel tramway, hoists, steel storage bins, etc., are included in the plans. William O. Wallen is general manager.

The Riverside Paper & Fibre Company, Appleton, Wis., will spend about $25,000 in steam power equipment, including three Wickes boilers of 900 hp., with Detroit stokers.

The Boland Machinery Company, Chicago, has interested Beloit capital and intends either to move its present works to Beloit, Wis., or erect a large branch plant for the exclusive production of ice and refrigerating machinery. Definite plans will not be made public until after September 1.

The subscription committee which is canvassing Watertown, Wis., for the purpose of raising $100,000 for the organization of a malleable iron foundry company, reports that three-fourths of the proposed stock issue has been subscribed for. As soon as the $100,000 is subscribed, the company will be organized and proceed with plans for a foundry with 2000 tons per annum capacity.

Trustees of the Stout Institute, Menominee Falls, Wis., are about to receive bids for $200,000 worth of new construction and equipment, including new boilers and engines for the central heating plant. Prof. Loren D. Harvey is superintendent.

The Farmers' Milling & Elevator Company, Palmyra, Wis., has applied for franchises to furnish electric light and power to the village and throughout the surrounding territory. E. B. Heimstreet is president.

The Menasha Pump & Foundry Company, Menasha, Wis., has been incorporated by Samuel Kellum, W. G. Kerfoot and A. D. Paul to establish a plant for the manufacture of power and hand pumps. The corporation is capitalized at $50,000.

The power plant of the Prairie City Electric Company, Prairie du Chien, was destroyed by fire. The loss is $10,000. The plant will be rebuilt at once.

J. H. Optenberg, president of the Optenberg Iron Works, Sheboygan, Wis., declares to the citizens that unless the plant is provided with a side-track he will be obliged to consider offers to locate elsewhere. When he built the plant he was given the assurance of such facilities.

The Eagle Mfg. Company, Appleton, Wis., manufacturer of gasoline engines for tractors and a line of farm engines, is working overtime and the officers are contemplating extensions. Improvements to the foundry will be made at once.

The C. F. Kade Fixture & Show Case Company has been organized by C. F. Kade, Arthur W. Kade and Paul E. Bode of Sheboygan, Wis., and will at once establish a plant for the manufacture of metal and wood fixtures for banks, offices and stores, at Plymouth, Sheboygan County.

The Racine Mfg. Company, Racine, Wis., metal and wooden automobile bodies, is planning to increase its production, having booked orders which will keep the plant running at top speed for a year. Numerous changes have been made in the executive and administration department. Frank K. Bull, president, has retired. Mr. Bull is president of the J. I. Case Threshing Machine Company of Racine and was unable to devote the required time to the Racine Mfg. Company. C. A. Hamilton, the new president, was formerly associated with the Wisconsin Engine Company, Corliss, Wis., and recently resigned as vice-president of the Lavigne Gear Company, Racine, to take his present

position. W. F. McCaughey, Racine, has been elected vice-president. Harold Smith continues as secretary and George Jaegers as treasurer.

The Menasha Pump & Foundry Company, Menasha, Wis., has been incorporated by Samuel Kellum, W. G. Kerfoot and A. D. Paul with a capital stock of $50,000.

St. Louis

St. Louis, Mo., August 18, 1913.

Since the beginning of the month the machine tool business has experienced a continuous falling off until now there is practically no inquiry from the surrounding territory and what business is developing is chiefly city trade. The outside defection is regarded as almost wholly due to the crop scare consequent upon the drought, but as it is developed that only certain spots are seriously affected it is expected that business will pick up again. At present, however, there is not enough business in the market to indicate any particular source of demand as standing out above any other. Collections are reported fair.

The Nicotine Mfg. Company, St. Louis, has been incorporated with a capital stock of $15,000 by John S. Carter, J. L. Carter, F. C. Hawley and others.

The Palmer-Meyer Motor Company, St. Louis, has been incorporated with a capital stock of $100,000 by Charles W. Palmer, Frederick C. Meyer and Ferdinand A. Meier, to manufacture automobiles and accessories and equip a repair shop.

The Columbia Mineral Water Company, St. Louis, has been incorporated with a capital stock of $20,000 by Edgar W. Stutz, Patrick J. Fitzgerald and others to equip a plant for the manufacture of soda waters, etc.

The Monsanto Chemical Works Company, St. Louis, has increased its capital stock from $100,000 to $250,000 for the purpose of extending its equipment and operations.

Frank W. Feuerbacher, St. Louis, who recently bought the plant of the Carondelet Milling Company, is having plans prepared for remodeling the plant and the installation of new equipment by a new company soon to be incorporated.

Edwin Drescher, St. Louis, who recently financed a horse and mule feed company, has plans for the construction of a mill to cost with equipment about $150,000.

Van Briggle & Smith, St. Louis, have plans for the construction of a machine shop at 4321 Obear avenue, the equipment to cost about $5000.

The Commercial Acid Company, St. Louis, whose plant at East St. Louis, Ill., was burned recently, has about completed plans for increasing its equipment, replaced after the fire, by the expenditure of about $30,000.

The Tower Grove Sanitarium Company, St. Louis, is preparing for the equipment of a $100,000 hospital under the supervision of William H. Gruen, which will require considerable electric and heating equipment and power machinery.

The St. Francois Motor Company, Farmington, Mo., has been incorporated with a capital stock of $14,000 by M. L. Clardy, Jr., R. P. Lang and Carlisle E. Rozier, to equip a repair plant and garage.

The University of Missouri, Columbia, Mo., which has plans for a large electric plant, will construct it gradually and in the meantime will remodel the present plant and install new boiler equipment.

The Automatic Car Brake Company, St. Joseph, Mo., advises that it will have its work done on contract for the present. It intends to contract with manufacturers of railroad supplies, and with foundry and machine companies who are in a position to manufacture the brake. Later on the company plans to take over an existing foundry and machine plant.

W. M. Fitzgerald, Carthage, Mo., has established a factory in a building 40 x 120 ft., for manufacturing iron gates and ornamental fence. He is in the market for a pipe bending machine, power drills, wire weaving machines, and forge tools.

A sewage system to include a septic tank, filter, pumps, etc., is to be designed and installed at Salisbury, Mo., by the Meredith Company, of Moberly, Mo.

The American Scale Company's plant at Independence, Mo., was burned last week with a loss of $80,000. Replacement plans have not been announced.

The Gulf Compress Company, Argenta, Ark., whose plant was recently destroyed by fire, has completed plans for reconstruction. Columbus Bierce is in charge.

The King Sheet Metal Works, 414 West Fourth street, Oklahoma City, Okla., has undertaken the manufacture of oil cans and plans the erection of a factory in the near future. W. G. Mahaffy is manager.

A cotton gin is planned for early construction at Star City, Ark., by Grumbles & Thomas. W. A. Echols is in charge.

The American Stone Company, of Floyd's Knob, Ind., is considering the construction of a branch of its whetstone plant at Little Rock, Ark., to utilize the product of the mines near Butterfield, Ark.

The Lenker Hub & Mfg. Company, Leslie, Ark., has been incorporated with a capital stock of $15,000 by W. S. Mays, G. W. Mays, E. O. Mays and Buck Mays, to equip a plant for the manufacture of hubs and other wood products.

The Kerr Glass Company, which is to equip a plant at Sand Springs, Okla., announces that it will begin the construction of the factory within the next 30 days.

The Oklahoma Hosiery Company, of Oklahoma City, Okla., recently reported incorporated with a capital stock of $25,000, will install a plant as quickly as machinery can be obtained. T. H., M. J. and M. H. Lindley, F. M. Riley and others are interested.

The Tulsa Glass Company, Tulsa, Okla., is announced to have plans for increasing its equipment to enable enlarging its output at least 25 per cent.

The Western Brick & Tile Company, Oklahoma City, Okla., has been incorporated with a capital stock of $200,000 by J. A. Wilhanks, of Norman, Okla.; W. H. Cogshell, of Oklahoma City, and J. W. Phillips, of Washington, Okla., to equip and operate a brick and tile manufacturing plant.

The Chickasha Light, Heat & Power Company, Chickasha, Okla., in increasing the capacity of its plant will install about 1000 additional steam hp., an 800 kva. steam turbine generator, condensing equipment, 325-hp. boiler, and 900-kw. high tension transformer.

The city of Marietta, Okla., has employed the Benham Engineering Company, of Oklahoma City, Okla., to prepare plans and specifications for extension of both its electric light and its waterworks plants.

The Magnolia Petroleum Company, Beaumont, Tex., will equip plants and tanks as well as piping equipment at McAlester and Electra, Okla. About 94 miles of pipe line are contemplated and about $2,000,000 altogether will be expended.

The Mid Continent Glass Sand Company, Oklahoma City, Okla., has been incorporated with a capital stock of $40,000 by H. G. Larsh, T. W. Cleiland, Gosche Thompson and L. M. Speer, and will equip a plant at once at Roff, Okla., for the purpose of preparing glass sand. It is in the market for the necessary crushing, screening, drying and quarrying equipment, for 300 tons daily capacity.

The Muskogee Vehicle & Machinery Company, Muskogee, Oklahoma, incorporated with a capital stock of $10,000, does not intend to engage in manufacturing, but will open September 1 a store for the sale of a general line of power machinery and vehicles. The officers of the company are as follows: R. A. Lester, president and manager; N. Lester, treasurer; Walter Van Allen, secretary.

The Gulf, Colorado & Santa Fé Railroad is completing arrangements for the construction at Guthrie, Okla., under the direction of F. Merritt, chief engineer, Galveston, Tex., of a water plant, reservoir, pumps, etc., to cost about $100,000.

The city of McAlester, Okla., is in the market for road machinery, including a 10-ton roller and traction engine, scarifier, wagon tank, etc., for use in road improvement. J. M. Gannaway, City Clerk, should be addressed.

Morris & Co., Chicago, are reported to have acquired a site at Montgomery, Ala., where a fertilizer plant costing $100,000 will be erected in the immediate future.

The city of Batesville, Miss., will build a waterworks plant under an authorized bond issue of $18,000.

Machinery for the manufacture of composition roofing is being sought by J. L. Wellborn, of Hattiesburg, Miss., who plans the establishment of a factory.

A creosoting plant is to be equipped at Shubuta, Miss., by R. J. Morra, who is in the market for equipment for handling piling up to 60 ft.

The city of Georgetown, Miss., will construct a waterworks plant as soon as details can be arranged, probably early in September.

The city of Louisville, Miss., will receive bids until September 2 for equipping a water and sewer system, machinery, etc., to cost $32,000.

The highway commissioners at Magnolia, Miss., will improve about 60 miles of road and are in the market for necessary mechanical equipment. Xavier A. Kramer is in charge.

The Memphis Cotton Oil Company, Lexington, Miss., has been incorporated with a capital stock of $120,000 by G. G. Harvey, of Lexington; B. B. Harvey, W. W. Barbour and others of Memphis, Tenn., and will equip a plant at once.

The Magnolia Compress Company, Magnolia, Miss., has been incorporated with $10,000 capital stock by I. W. and T. B. Lampton and F. F. Becker and J. H. Johnson to equip a cotton compress.

The Clyde Machine Works, Gulfport, Miss., is in the market for a 30-hp. vertical tubular donkey boiler.

The Axleless Wheel Company, New Orleans, La., has been incorporated with $250,000 capital by G. W. Nichols, H. P. Meyers, P. F. Schanute and others, and a plant is to be equipped at once, it is announced.

The Shreveport Brick and Tile Company, Shreveport, La., recently incorporated with T. P. Lloyd as president, will equip a plant with a capacity of 40,000 brick daily.

The Venice Drainage District, Venice, La., is in the market for equipment for the construction of about eight miles of canal. A. A. Buras should be addressed.

The town of Melville, La., will install an electric light system, a tax having been formally voted for the purpose.

A foundry of considerable size is reported to be planned at Columbia, La., by W. O. and E. B. Humphries.

The Rayne Milling & Ginning Company, Rayne, La., has been incorporated with a capital stock of $10,000 by John P. Mouhoules, Narvine Kahn and others to equip a ginnery.

The city of Mansfield, La., has plans for the equipment of sewer and water plants under a bond issue of $70,000, the mayor being in charge.

The plant of the Elliott Electric Company, Shreveport, La., was burned last week with a loss of about $15.000. It will be replaced, it is stated.

The Mississippi River Commission, New Orleans, La., will receive bids until September 2 on the furnishing of a complete levee building machine.

The Singer Sewing Machine Company, New York, is reported to have plans for the establishment of a large hardwood mill at Tallulah, La. The company recently acquired timber at that point.

The Forest Products Company, New Orleans, La., is considering the establishment of a plant at Alexandria, La., for the manufacture of by-products from sawmill waste. The cost of the proposed plant will be $100,000.

Texas

AUSTIN, TEXAS, August 16, 1913.

Showers have relieved the extremely hot and dry weather in some parts of the cotton-growing belt, improving the crop prospects. In northern Texas many new gins and a number of compresses and cottonseed oil mills are being erected. There is also a large demand for ginning machinery in western Texas. One of the features of the machinery trade in this State and other parts of the Southwest is the widespread and constantly increasing demand for road-making equipment.

It is reported that the Mexican Petroleum Company will soon begin the construction of an oil pipe line from the oil fields in the vicinity of Tampico, Mexico, to the City of Mexico, about 600 miles. The company obtained a concession from the Mexican Government for the proposed pipe line some years ago. Several pumping stations would be erected along the route.

The Texas Company of Houston will enlarge the oil pipe line system of the Louisiana Oil Company which it recently acquired.

The Gulf, Colorado & Santa Fé Railroad has made provision for the erection of shop additions.

The Wellington Power & Light Company will erect an electric light and power plant at Wellington. D. E. Godwin is interested.

It is announced that the Van Horn Valley Land & Railway Company, Van Horn, Texas, which was recently incorporated with a capital stock of $1,500,000, will soon begin boring a number of wells on a tract of 500,000 acres of land in western Texas. It is purposed to install an irrigation pumping plant at each well. R. H. Owen, Minneapolis, Minn., is president of the company.

The Lubbock Irrigation Company will bore a number of wells near Lubbock and will install a pump and gasoline engine on each well.

A. L. Bowman and associates will erect a factory at Dallas for the manufacture of storage batteries.

The Texas Power & Light Company has purchased a site for its proposed electric power plant which it will erect at Waco. It is not known when the work of constructing the plant will be started.

John Gaida is erecting a machine shop and garage at Ennis.

The Kingsville Planing Mill & Mfg. Company will erect a planing mill and woodworking plant at Kingsville. E. M. Crawford is interested.

The Farmers' Gin Company has been organized for the purpose of erecting a cotton gin at Roanoke. J. R. Bourland is interested.

The Roanoke Creamery Company will erect a creamery at Roanoke. W. P. Davis is interested.

The Vulcan Iron Works will erect an iron-working plant at Houston. J. Wood is interested.

The Aransas Compress Company, Dallas, Texas, which has been incorporated with a capital stock of $125,000, will erect a cotton compress. S. W. King, Jr., is interested.

Big Springs, Texas, will enlarge and reconstruct its waterworks system.

The Texas & Pacific roundhouse at Marshall, Texas, was almost entirely destroyed by fire August 9. It is understood that plans for rebuilding will be prepared at once.

The Pacific Coast

PORTLAND, ORE., August 13, 1913.

The machine tool trade is still rather quiet, though a few fair orders for tools and general shop equipment are coming out and somewhat more activity is expected within the next month. Logging and lumber manufacturing machinery is quieting down a little and the outlook is uncertain, many prospective developments being held up for the present both by lack of money and the drop in the lumber market. Logging operations in the Columbia River district have not yet been fully resumed and some mills have curtailed operations. The demand for lumber, however, seems to be improving and a revival in this line would bring out many delayed orders for machinery. A number of mills have been burned this season, and in most cases they will be rebuilt. There is a steady call for implements, small power units and miscellaneous machinery from the interior, and agricultural machinery is still an important factor in shipments to Siberia and the Orient.

Work will be started during the fall on the Portland, Eugene & Eastern Railroad shops at Oregon City, Ore. The first buildings will be a concrete foundry and a machine shop at an estimated cost of $90,000.

The Port Commission at Seattle, Wash., has taken figures and will place orders shortly for a locomotive crane for lumber handling at Smith Cove and an electric hoisting machine at Salmon Bay. The estimated cost of the entire installation is $100,000.

It is reported that the terminal of the Camas Prairie Railroad at Lewiston, Idaho, will be improved at a cost of $200,000, complete accommodation being provided for 500 cars and 40 locomotives.

Fifty machinists at the Chicago, Milwaukee & St. Paul Railway shop at Tacoma went on strike a few days ago, but returned to work the first of the week.

Prouty Bros. are building a sawmill at Seaside, Ore., and will put in machinery from a plant at Ferndale, Wash., with various additions.

The Glenburn Flour Mill, Glenburn, Cal., recently burned, is being rebuilt, and orders are being placed for machinery.

The Booth-Kelly Lumber Company is preparing to rebuild its sawmill at Springfield, Ore., which was burned in 1911. It is announced that the plant will cost about $250,000.

Plans are under way for the enlargement of the light and water plant at Heppner, Ore.

Plans have been completed for a municipal light plant for Baker City, Ore., specifying a 150-hp. water wheel and a 100-kw. generator.

The Veness Lumber Company, Winlock, Wash., is starting work on an electric power plant to furnish 1000 hp. for its mill. The machines are to be operated by individual motors, as recently reported.

The Oregon Lumber Company has placed orders with the Allis-Chalmers Company for an electrically operated saw and planing mill at Dee, Ore.

The International Power & Mfg. Company is making preliminary arrangements for a large hydroelectric development on the Pend d'Oreille River, near Metaline Falls, Wash. It is reported that about 350,000 hp. will ultimately be developed.

M. F. Archer, manager of the Archer Riveting Machine Company, Chico, Cal., has gone East to arrange

for the manufacture of the machines. The device is intended for use in the manufacture of overalls, etc., and a number of orders have been taken.

The voters of Olympia, Wash., have authorized $150,000 bonds for constructing a municipal waterworks system.

The Llewellyn Iron Works, Los Angeles, Cal., has decided to move to Torrance, where a new plant is to be erected at an approximate cost of $750,000.

Work has begun on the Atchison, Topeka & Santa Fé new terminal at Redondo Junction, Cal., including the erection of a 35-stall roundhouse; a machine shop building, 60 x 132 ft.; a storehouse, 60 x 160 ft.; wood machinery and carpentry shop, 40 x 100 ft.; car repair sheds, 52 x 307 ft.; power plant, 60 x 80 ft., all of re-inforced concrete. The cost will be about $350,000. It is reported that the same company has purchased land in Los Angeles, Cal., on which it will erect new repair and machine shops.

The Day & Night Solar Heater Company, Monrovia, Cal., has let the contract for a new factory building to be 53 x 150 ft. Light machinery, electrically driven, will be installed.

The Phoenix Milling Company has let contracts for the construction of a new flour plant at Sacramento, Cal.

Eastern Canada

TORONTO, ONT., August 18, 1913.

The American Locomotive Company has taken out permits for the erection of additional buildings at its main plant at Longue Pointe, Que. One addition had only been completed when still larger extensions were required to keep pace with the business offered. The plants of the company are still working on night and day shifts.

The E. B. Eddy Company, Ltd., is constructing a new power house and pulp mill at Hull, Ont., at a cost of about $750,000. When the new power house is finished the company's power will be increased from 8500 hp. to between 16,000 and 18,000 hp. The company is also enlarging and deepening the forebays and intakes of its plant and increasing the draft tubes. The new building will be used to manufacture ground wood and wood and paper products.

Allan G. McAvity, the representative of the Canadian Buffalo Forge Company of Montreal, has announced that the company contemplated starting building at Berlin, Ont., in about two weeks.

The backbone of the iron molders' strike was broken when the officials of the Standard Foundry & Machinery Company of Longueuil, Que., and of the Ames Foundry Company signed the union agreement and 70 men returned to work. The strikers succeeded in gaining their point, working from now on under a nine-hour-a-day schedule.

A by-law was carried at Brantford, Ont., to grant a bonus of $20,000 to the Watsons, Ltd., manufacturer of wire screens, Toronto, but removing to Brantford.

A new grain elevator especially for grain export trade, with a capacity of nearly 3,000,000 bus., will be built by the Harbor Commissioners of Montreal. Although the site has not been decided upon it has been announced that the new elevator will be situated in the east end in such a way that boats can be unloaded on one side and loaded on the other.

Work on the Longueuil plant of the Sir W. G. Armstrong, Whitworth & Co., Ltd., has been quietly progressing all summer. M. J. Butler announces that the concrete foundations are almost completed. The first building will be up by the middle of December and the plant will be running by May 1, 1914. This part of the plant will be equipped for the manufacture of high speed steel, twist drills and other high speed tools. Other departments will be gradually added.

The Canadian Marble Company, Ltd., will locate at St. Johns, Que. The company prepares marble for interior use.

The Canadian Brake Shoe Company will shortly commence operations in Sherbrooke, Que. It will make steel and brass forgings by electricity and will be the first plant of the kind in Canada. Toronto men are behind the company.

The Hartt Accumulator Company, London, England, will establish a plant in St. Johns, Que., for the manufacture of electrical supplies and may concentrate its Canadian business there.

The Mallinckrodt Chemical Works, Ltd., Montreal, has been incorporated with a capital stock of $100,000 by J. W. Blair, C. A. Hale, R. W. Gibb and others to manufacture drugs and chemicals.

The American Flexible Bolt Company of Canada, Ltd., Montreal, has been incorporated with a capital stock of $75,000 by E. E. Howard, Jacob DeWitt and others to manufacture bolts.

The LaSalle Construction Company, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by W. L. Shanks and others to manufacture gas-making plant and apparatus.

The Dods Knitting Company, Ltd., Orangeville, Ont., has been incorporated with a capital stock of $100,000 by Andrew Dods, Mervil MacDonald, F. H. Snyder and others.

The Universal Paint & Varnish Removal Company, Ltd., Tillsonburg, Ont., has been incorporated with a capital stock of $50,000 by J. H. Teall, A. R. Nickerson, G. W. Tillson and others.

Standard Wrapping Machines, Ltd., Tronto, has been incorporated with a capital stock of $20,000 by J. P. Northey, T. H. Plummer and others to manufacture wrapping machines.

John C. Mundell & Co., Ltd., Elora, Ont., has been incorporated with a capital stock of $300,000 by J. C. Mundell, J. A. Mundell and others to manufacture wooden and metal furniture.

The Turbine Equipment Company, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by J. L. Ross, C. J. Frederick Collier and others to manufacture turbines and other machinery.

The International Specialty Mfg. Company, Ltd., Bridgeburg, Ont., has been incorporated with a capital stock of $20,000 by W. G. Edwards, F. E. Jackson, W. R. Krafft and others to manufacture furniture, stove and other polishes.

The Perfect Knitt Mills, Ltd., Listowell, Ont., has been incorporated with a capital stock of $50,000 by M. E. Becker, William Climie and others to manufacture clothing.

A by-law to grant exemptions to the James Langmuir Paint Company of Toronto was carried at Oakville, Ont. The company has purchased several acres north of the Grand Trunk Railway.

Fire caused about $20,000 damage to the Canada Steel Company, Hamilton, Ont. The motor room was destroyed. The flames spread to the machine shop and the blacksmith shop and then to the large mill.

Work has begun on the erection of a new plant for the London Brick & Tile Company, London, Ont.

The Mentholatum Company, Bridgeport, Ont., has given the contract for the erection of a two-story and basement reinforced concrete factory building 60 x 80 ft. to the Turner Construction Company, Buffalo.

Pillington Bros., Ltd., Toronto, will erect a large plate glass factory at Richmond and Portland streets. The estimated cost is $115,000.

The Hot Point Electric Heating Company, Toronto, Ont., has completed plans for a power house which it will build at an estimated cost of $250,000.

Stewart & Wilton, architects, Hamilton, are preparing plans for a foundry building to be erected by the Otis-Fenson Elevator Company, Hamilton.

Western Canada

WINNIPEG, August 16, 1913.

Local machinery houses report business quiet. The outlook, however, continues favorable. A few new projects are under contemplation, but work on these is not likely to be started until the money situation becomes easier. There is not as much industrial activity by a considerable margin as at the corresponding time last year. Western municipalities are using a moderate amount of supplies for waterworks, electric light plants and other public utilities, but the effect of the financial stringency is noticeable. Considerable machinery is being used for renovating country grain elevators.

The planing mill of the Crow's Nest Lumber Company, Wardner, B. C., burned a few days ago, with a loss of about $30,000, partly covered by insurance. It had a capacity of 200,000 ft. per day. The work of rebuilding will start without delay.

Col. F. S. Meighen, president of the Lake of the Woods Milling Company, Ltd., arrived in Winnipeg from Montreal recently and stated that his company would likely build another large flour mill in Western Canada in the near future. The location has not been decided upon.

The City Commissioners of Regina, Sask., are planning a power house, to be located at Lakeview, at a cost of about $30,000. The superintendent of light and power is E. W. Bull.

The Town Council of Melville, Sask., is planning the installation of sewage disposal works. The secretary is F. H. Clarkson.

The F. A. Guy Grain Company, Fort William, is erecting a grain drying plant in connection with its elevator.

The Canadian Government is extending the operations of the cold storage system in the West to benefit the meat shippers and consumers, and a large warehouse is to be erected at Vonda, in central Saskatchewan. The contract for the building was awarded to Henry Gauvin.

The new terminal being built for the Fort William Elevator Company at West Fort William, commonly known as the David Horn Elevator, is fast assuming a finished appearance. The total capacity of the elevator will be 2,000,000 bushels. A special feature is the drying plant to be used for the treatment of tough or damp wheat, the capacity being 1000 bushels per hour.

The Farmers' Elevator at Holland, Man., was destroyed by fire. The loss is estimated at $10,000.

What will be the largest powder plant in Canada will be established on James Island, B. C., by the Canadian Explosives, Ltd., a company recently reorganized to include the Hamilton Powder Company and the Victoria Chemical Company, Ltd., and the controlling interests in which is held by the Nobel's Explosives, Ltd., of Glasgow, Scotland. A plant, to cost about $1,250,000, will be built on an 800-acre islet a short distance from Victoria, B. C. Most of the machinery will come from England and the United States, although some will be the output of Canadian factories. The output of the new factories will be 100 tons of high explosives and black powder daily.

Government Purchases

WASHINGTON, D. C., August 14, 1913.

The Bureau of Supplies and Accounts will open bids September 2 under Schedule 5738 for a universal tool-grinding machine for Philadelphia.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids August 12 for supplies for the navy yards as follows:

Schedule 5677—Steam Engineering.

Class 61, Norfolk—Two 16-in. back-geared crank shapers—Bid 2, $434.50; 38, $322; 41, $395, $380 and $345; 45, $369; 68, $352 and $328; 82, $423, $334, $366 and $354; 87, $458; 89, $328; 112, $325; 119, $768.

Class 62, Norfolk—Two 26-in. upright sliding head drills—Bid 2, $382; 38, $266 and $306; 41, $248; 45, $343; 68, $377 and $253; 82, $262; 87, $268; 89, $230; 112, $265 and $310; 119, $292.

Class 63, Norfolk—Two tool-grinding machines—Bid 38, $54; 41, $62; 68, $49.80 and $58.25; 82, $54 and $57; 89, $53.90; 119, $56.74; 122, $88.

Class 64, Norfolk—Two 5-hp. vertical self-contained steam engines—Bid 82, $285; 103, $297.

Class 65, Norfolk—Two engine lathes—Bid 2, $980; 38, $664 and $798; 41, $943, $1068 and $858; 45, $1046; 68, $859.35, $794 and $689; 82, $1098, $975, $730 and $1000; 87, $898; 89, $810 and $860; 112, $803.

Schedule 5678—Steam Engineering.

Class 66, Brooklyn—One 14-in. tool-room lathe—Bid 38, $598; 41, $599; 45, $642; 56, $540; 68, $628.20; 82, $665; 95, $616; 121, $624.

Class 67, Brooklyn—One 28-in. screw-cutting engine lathe—Bid 38, $1149; 41, $1095; 56, $1320; 68, $1236.40; 82, $1445 and $1358; 87, $1535; 89, $1085 and $1124; 95, $1135; 112, $1012 and $1162; 121, $1427.

Class 68, Brooklyn—One 21-in. vertical drill—Bid 56, $136; 68, $99.85; 82, $125 and $91; 89, $82; 95, $160.50 and $176.50.

Class 69, Brooklyn—One 15-in. column tool-room shaper—Bid 56, $423; 68, $426.40 and $344.80; 82, $415 and $410; 89, $259 and $284; 95, $490 and $432; 121, $390.

Class 70, Brooklyn—One square base, double-wheel emery grinder—Bid 35, $35.80; 38, $31; 68, $20 and $26.80; 82, $25; 89, $23.20 and $26.20; 95, $26; 122, $45.

Class 71, Brooklyn—One 6 x 6-in. vertical steam engine—Bid 82, $237; 103, $270; 130, $203.50.

Following is a list of bidders whose numbers are found with the bids given above:

2. Alexander & Garsedt. 38. Frevert Machinery Company. 41. Fairbanks Company. 45. Garvin Machine Company. 56. Hill, Clark & Co. 68. Kemp Machinery Company. 82. Manning, Maxwell & Moore. 87. Niles-Bement-Pond Company. 89. D. Nast Machinery Company. 95. Prentiss Tool & Supply Company. 103. B. F. Sturtevant Company. 112. Frank Toomey & Co. 119. Universal Trading Company. 121. Vandyck-Churchill Company. 122. Valley City Machine Works. 130. Wm. E. Williams.

The following bids were received by the purchasing agent, District Government, Washington, D. C., August 12 for furnishing six 12-in. sewing motor head wood-turning lathes:

National Electrical Supply Company, $145 each; total, $870.

Kemp Machinery Company, with 4-in. bed, $116.67 each; total, $700. With 5-in. bed, $121.67 each; total, $730.

Oliver Machinery Company, No. 53-A, 12 in., $129.60 each; total $777.60. No. 53-B, 12 in., $132.75 each; total, $796.50.

Aumen Machinery Company, No. 1064 American, 12 in., $138 each.

Gas Producer Engines for Coal Barges

A fleet of large self-propelled barges to ply between New Orleans and the coal fields of northern Alabama is of peculiar interest in that they are the first craft of their kind in America to be propelled by producer gas engines. They are also the first craft to take coal from the Alabama fields to New Orleans wharves by water. Alabama coal has heretofore been shipped to New Orleans by rail. The barges follow almost as direct a route. Starting from the coal fields, they go down the Black Warrior, Warrior and Tombigbee rivers, across Mobile Bay and proceed to New Orleans by way of Mississippi Sound, Lake Borgne, Lake Borgne Canal and the Mississippi River, a total distance of a little over 500 miles.

The barges are of steel construction, and are similar in design to those in use on the canals of Holland. Their measurements are as follows: Length, 240 ft.; width on deck, 32 ft.; width at bottom, 28 ft.; depth, sides, 8 ft.; depth, center, 8½ ft.; draft, when fully loaded, 7 ft.; their capacity is 1000 tons. They are propelled by twin screws driven by twin engines and have a speed of approximately 7 miles an hour when fully loaded. The weight of each barge and equipment is close to 240 tons.

The screws are driven at 300 r.p.m. by two 75-hp. vertical producer gas engines. Gas for the engine is furnished by a 150-hp. producer. The fuel used for the producer is what has heretofore been a waste coke from the ovens of the Birmingham district and which consequently is secured at a low price. This coke is practically pea size. It has a calorific value of about 11,000 B.t.u. and the consumption is approximately 1 lb. per hp. hr. Bunkers are provided to hold about 15 tons of fuel. Each producer is equipped with scrubber, gas tank, tar extractor and is fitted with water bottom.

While the main power plant is of primal interest the auxiliary power equipment of the barge also merits mention. This consists of a 9-hp. gasoline engine, which drives a centrifugal pump handling the ballast and bilge water, a blower, an air compressor and a 5½-kw. direct-current generator. Current is used for electric lights throughout the boat, fans in cabins and engine room, a 32-candlepower search light and a 5-hp. motor. An arc light is mounted on the roof of the pilot house and galley, which are immediately over the engine room. The motor is for operating an anchor winch. The generator is so mounted that when the large engines are running it may be belt-driven from one of them. A second 4-in. centrifugal pump is also installed to be driven by one of the large engines through friction wheel contact.

A decided advantage of the self-propelled barge for use in these waters is that they can negotiate the numerous locks on the Warriors and Tombigbee rivers in much less time than if towed. Each lock can be passed in 20 min. by these vessels, whereas more than an hour would be consumed by the towed fleet system.

The barges will make the trip from the mine region to New Orleans in 72 hours, and with all 15 vessels in service it is estimated that coal will be moved into New Orleans at the rate of 50,000 tons a month. Added revenue will be derived by the barges carrying freight on the return trip to the coal field.

The Alabama & New Orleans Transportation Company, of which John H. Bernhard is vice-president and general manager, controls the Lake Borgne Canal, which is the key to the route traversed by these barges, and it is to this company that the new departure in Alabama coal transportation is due. All the barges are being built at the company's own shipyard, located at a point about 12 miles below New Orleans, where the canal empties into the Mississippi. The first barge was launched June 4, and it and one launched in July are now in commission. A third boat has now been launched, it being the company's plan to construct one a month until the fleet numbers 15. All the power equipment for the barges—engines, gas producers, motors, generators, pumps, air compressors, etc.—was designed and furnished by Fairbanks, Morse & Co.

The Finrock Iron Works, 405 East Ninety-ninth street, New York, was placed in the hands of Milton M. Stitzfeld, as receiver, August 11, and permission was given by the court to continue business for 20 days.